

THE IRON AGE

DUCTION -- MANAGEMENT

NOVEMBER 30, 1933

PROCESSES -- NEWS

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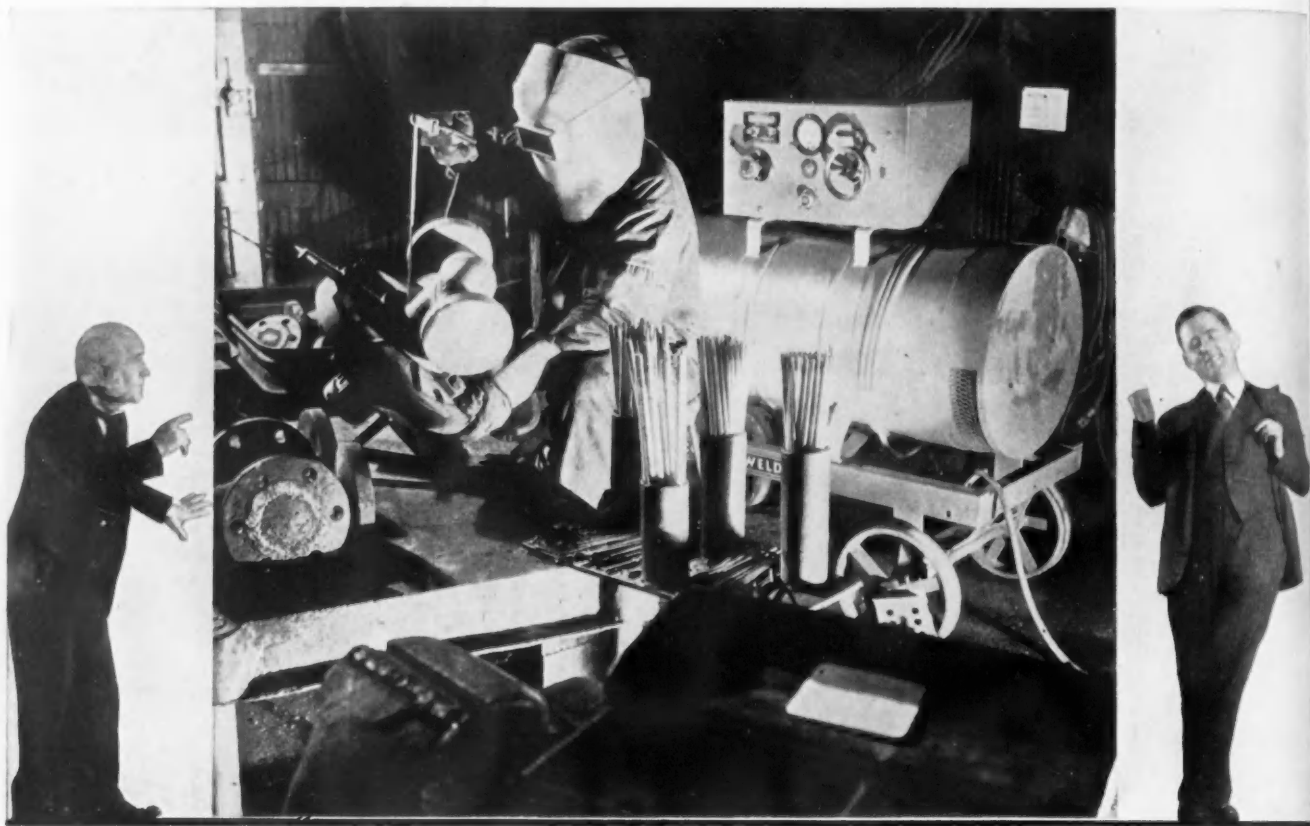
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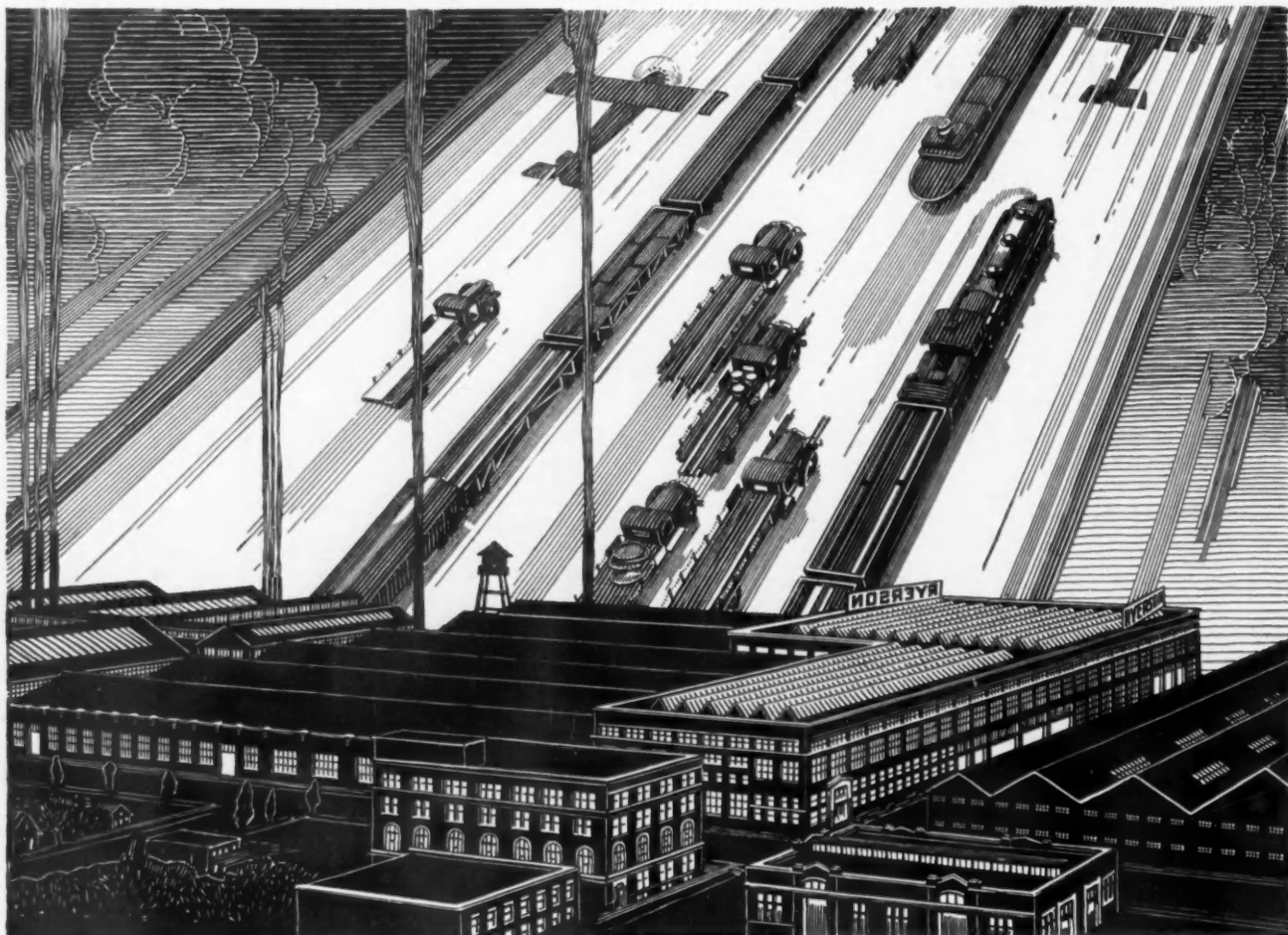
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... THE IRON AGE ...

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Vol. 132, No. 22



The Little Pig and the Three Bad Wolves

WHAT is keeping this little pig indoors?

He believes that he sees three bad wolves prowling about his house and is afraid of them. So he has bolted the door and hidden his pocketbook under the bed.

Perhaps these wolves are imaginary. Perhaps they haven't the long ears and big teeth that he thinks they have. But until some one convinces him that they mean no harm to him, he is going to stay in his little brick house.

The little pig, of course, represents the private investor, who normally provides the funds for the buying of capital goods.

Uncle Sam wants to get the little pig out of the house and to have him bring his pocketbook out with him. For until he *does* come out, Uncle Sam will be about the only real buyer, directly or indirectly, of capital goods.

The best and the quickest way for Uncle Sam to get the little pig out and his pocketbook open is to convince him that these animals are not wolves but friendly little pets that will do him no harm. If that is an impossible undertaking, he should load his gun and shoot them.

Chevrolet Makes Ring Gears in W



Gears are carburized at the rate of 140 an hour in four-track, pusher-type electric furnaces. Above is shown the discharge end with a carburizing pot containing nine gears which has just come out of the furnace. ▲ ▲ ▲

By BURNHAM FINNEY
Detroit Editor, The Iron Age



THE Chevrolet Motor Co. uses rigidly controlled precision methods in making passenger car ring gears at its Detroit plant. The heat-treating, machining and inspection processes are herewith described. This is the first of a series of exclusive articles outlining the manufacturing practices of the Chevrolet company at its various plants.

THE Chevrolet Motor Co. is closing its third consecutive year as leader in volume of sales in the automobile industry. It has been able to maintain its top position by offering a car of quality workmanship and material at a low price. Without economical production methods, this low selling price would not have been possible, and economical production in turn could not have been achieved without modern shop processes and equipment.

To find outstanding examples of efficient methods employed by the Chevrolet company in the manufacture of its car, one might turn to any of its several plants. The production of ring gears and pinions for passenger cars at the gear and axle plant in Detroit is one of the most interesting examples. The department there, devoted to gear cutting and machining, is the largest department of its kind in the world and its methods are worthy of close examination.

Because of the nature of the work which they perform, gears constitute a product the manufacturing treat-

ment of which must be minutely scrutinized and rigidly controlled from operation to operation. Tolerances are thought of in terms of thousandths and ten-thousandths of an inch, and the slightest distortion of the gear teeth may cause trouble in the finished car. Realizing this fact, Chevrolet's production officials maintain a constant watch over the gear department to make sure that the quality of the work is uniformly high and materials in process flow freely at all times.

It is a part of the daily production practice to put try-out gears from every working shift through rigid tests and then over the assembly line to see that the bearing positions are correct and quietness has been attained. The time when the work apparently is progressing at the smoothest rate is the time when the closest vigilance is kept. This vigilance is necessary because there is no way to forecast in which direction a job may go—toward perfection or toward trouble. If it is toward trouble as it will infrequently be even in the

best organization, the operator is almost instantly aware of what has happened and moves rapidly to correct the defect.

Ring gears are made of alloy steel. From the forge shop the blanks go to an oil-fired normalizing furnace where they remain for six hours. The furnace is divided into two long sections paralleling each other. Blanks go in one section on an overhead conveyor from which they are suspended, travel its length and are switched over to the other section, moving through it and emerging at a point adjoining the loading position. Blanks are in each section about three hours. The overhead conveyors are arranged in four rows, with each vertical carrier capable of taking five blanks. Blanks pass through a hot zone for 40 min. The normalizing operation removes the strains set up by forging and makes the blank more machinable. After normalizing, the blank has a Brinell hardness of 4.6 to 4.7.

The front and back face of the blank is rough turned on a six-

s in World's Largest Gear Cutting Plant



spindle Mult-au-matic chucking machine having four operating stations and two loading stations. From 1/16 to 1/32 in. is removed by this operation. The hole of the gear then is broached on a vertical machine equipped with a special fixture.

Rivet holes are drilled in the gear on a double-head vertical drilling machine, each head of which has 12 spindles. Thus the machine drills 24 holes simultaneously, 12 in each of two gears. There are four stations, two of which are being loaded by the operator while the other two are in use. From the drill the gear blank moves to a special machine which stamps on the gear part number, the gear ratio, the month, the year and the Chevrolet trade-mark.

After the back face of the gear is ground to within 0.002 in., the outside diameter of the blank and the tooth face are finish turned and counterbored on a six-station Mult-au-matic chucking machine on which two consecutive stations do the same work. This makes the machine the equivalent of two machines. For this job special tools have been welded on to standard tool blocks. Special chucks are used to hold the work. In the base of the chuck is a spring controlling three fingers which hold the blank by being inserted in the rivet holes. The operator moves these fingers in and out by means of a hand lever.

At this point the blanks are placed in pan-type conveyors and taken to an inspection station where they are tested for runout, outside diameter, bore hole and face angle. The tolerance for the face angle is 0.005 in., for the outside diameter 0.004 in., and for the bore hole 0.0015 in. The back face is held to 0.002 in. on a surface plate.

Having passed inspection, the blanks are carried to the gear cutting machines. The ring gear used on the Chevrolet passenger car is an all-spiral bevel gear consisting of 37 teeth with a mating pinion of nine teeth. The pitch of the gear teeth diameter is 3.947 in., and the spiral angle is 38 deg. 4 min. The pressure angle is 14½ deg.

Teeth of gears are rough cut at the rate of five gears an hour on a standard gear cutting machine and are finish cut on 15-in. spiral gear cutting machines, the finishing time being 24 min. per gear. Speeds and

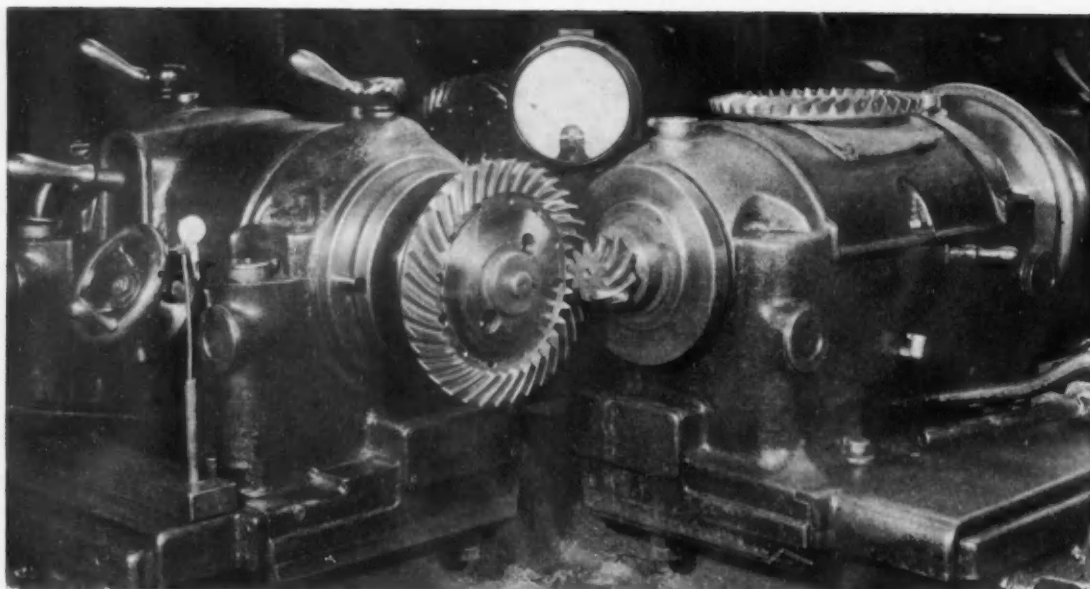
feeds of these machines are figured to give the maximum results for the type of steel used and the pitch of the gear. After the finishing operation, one gear from each machine twice during each 7½-hr. shift is tested for bearing position, size and finish. After roughing, gears are tested for proper tooth depth. The roughing operation leaves about 0.018 in. of stock on each side of the teeth for the finishing cut.

Between the two gear cutting operations, the back and front angles

of the gear teeth are chamfered at a 45-deg. angle on a gear chamfering machine. After being finish machined, gears are taken on an overhead conveyor through a washing machine where they are cleaned with a G. M. C. resin compound. Then they move to a gear testing machine and are rolled 100 per cent for size, runout, finish and position of bearings. From the testing machine gears are put into large metal containers and transported on electric trucks to the heat-treating department to be hardened.



After being carburized, gears are quenched in an oil quenching machine, the gear being held down in a die for 57 seconds. This method maintains a flat back on the gear and uniformity in the bore for roundness.



After being finish machined, gears are rolled 100 per cent for size, runout, finish and position of bearings.

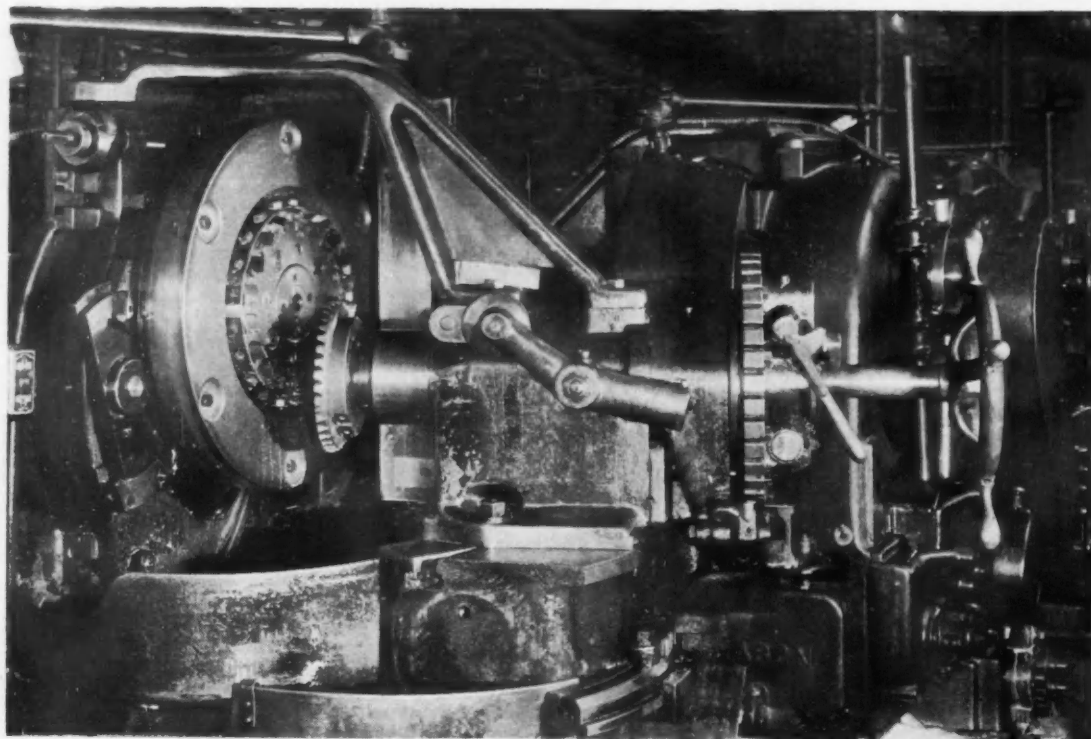
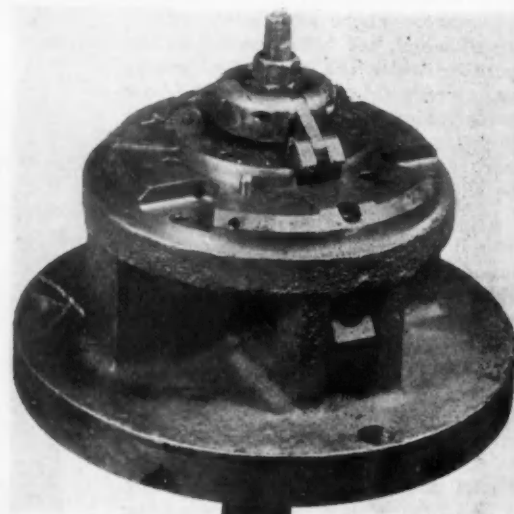


Nine gears are packed in a carburizing pot in a special compound and the pot is lifted by crane to the loading end of an electric pusher-type carburizing furnace. This furnace has four tracks, the hardening time being 9 hr. The temperature in the carburizing zone is 1650 to 1680 deg. F. One hundred and forty gears an hour are carburized to a case depth of 0.040 to 0.050 in.

At the discharge end of the furnace the packed carburizing pots are dumped by means of an overhead crane and the gears are quenched in an oil quenching machine, the gear being held down in a die for 57 sec. This method of quenching is for the purpose of maintaining a flat back on the gear and uniformity in the bore for roundness. Bores are kept with-



A special chuck is used to hold the gear blank in place on a Mult-au-matic machine for finish turning and counterboring the outside diameter of the blank and the tooth face. In the base of the chuck is a spring controlling three fingers which are inserted in the rivet holes to hold the blank. The operator moves the fingers in and out by means of a hand lever.



Gear teeth are rough cut at the rate of five gears an hour on a standard bevel gear cutting machine.



in limits from zero to 0.003 in. out of round and the back of the gear is held to a warpage of not over 0.003 in. thickness.

From the quenching machines the gears move on an overhead conveyor through a spraying and washing with G. M. C. resin cleaner compound for degreasing purposes. Thence they go through an overhead draw furnace the temperature of which is 325 deg. F. This furnace is designed so as to occupy a minimum of space, the conveyor loaded with gears making an S

are tagged with duplicate numbers, the gear moving down one line and the pinion down another until they finally are brought together in assembled form.

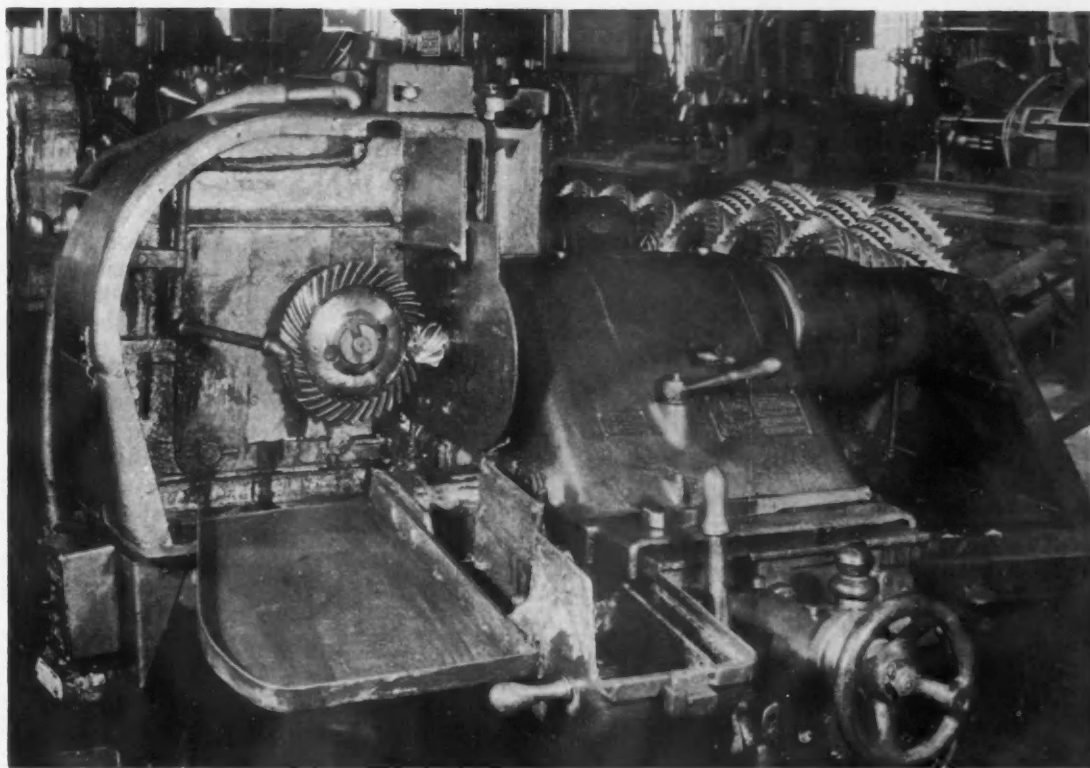
Pinions after being finish cut, are put through a burnishing operation on a spiral bevel pinion burnishing machine. This is accomplished by running a soft pinion in mesh with a hardened mating gear to smooth out any roughness on the profile of the pinion tooth. Instead of the rocking motion formerly used in burnishing,

ball bearings which are preloaded to eliminate radial and axial deflection. The operation is watched closely, with a pinion taken direct from the machine for inspection every 10 to 15 min. This precaution is taken to avoid the burnishing gear wearing down and not giving the proper smoothness to the pinions. Production on this machine is about 200 pinions per hour.

After being burnished, pinions are rolled 100 per cent for the position of the bearing, noise, size and errors by operators. They then go through

▲ ▲ ▲

To remove any roughness on the profile of pinion teeth, pinions prior to hardening are burnished on a spiral bevel pinion burnishing machine. A soft pinion is run in mesh with a hardened mating gear, being given a slight motion lengthwise of the face. In the photograph the metal guard has been lowered.



turn inside the furnace. From the time when they are loaded on the conveyor after being oil quenched until they are removed after the drawing operation, gears are en route 1 3/4 hr.

Gears then are brushed on a wire brush wheel to remove the dirt and scale, are file inspected and are tested for out of roundness. The Brinell hardness of the finished gear is 3.70 to 3.90.

Following heat treatment the outside diameter of the gears is ground, locating from the bore, after which the bore is ground, locating from the outside diameter. Gears are sent through a wash tank to remove grease and to an inspection bench, where the bores are inspected for size and the backs for flatness. They are hung on an overhead conveyor and carried to a gear testing machine and then mated with pinions on correct cones. The gears again are hung on the conveyor, going to an inspector who examines them for position of bearings and out of roundness. If they are approved the gear and pinion

the teeth are given a slight motion lengthwise of the face. That is, the pinion drives the gear and as the two rotate, the position of the gear is changed continuously and automatically to effect a combined horizontal and vertical movement relative to the pinion. As the position of the gear is changed, the pinion, which is held in mesh with a spring, moves in and out with the gear. This results in an in and out movement of the pinion with reference to the gear axis.

The pinion head is equipped with hardened rollers which ride on two hardened steel guides fastened to the top of the frame, allowing the head to move freely. It is adjusted horizontally with a hand wheel and adjusting screw. The driven spindle has both hand and backlash brakes, the former for use when setting up the work or for checking the tooth bearing before or after burnishing, and the latter to maintain an even load during the burnishing operation.

Spindles are mounted on matched

heat treatment and follow the same finishing process as ring gears.

In an opinion handed down by Judge Marcus B. Campbell in the United States District Court for the eastern district of New York in the case of Hiram A. Farrand, Inc., and the Stanley Works, New Britain, Conn., against a prominent chain store, the four patents on coilable rules of Hiram A. Farrand were sustained. The defendants were obliged to cease infringing and to deliver up for destruction all infringing rules which they now have on hand and to pay costs of suit. Hiram A. Farrand, Inc., owns rights in seven United States patents and has several patent applications pending. The Stanley Works is licensed under above patents and patent applications and also has several patent applications pending. No foreign manufacturer has any license under any of said patents or applications.



These pressure cast products illustrate the diversity of the process.

Brass Pressure Cast

By WILLIAM W. SEIG
Metallurgist, Titan Metal Mfg. Co.

MORE than a million brass pressure castings were made before the author of this article would describe the process and label it an economic addition to the metal fabricating arts. The new technique, the new types of die casting machines, and the new castings themselves are here described.

PERSISTENT rumors in 1930 of a successful brass pressure die casting process devised by Joseph Polak in Prague, Czechoslovakia, led to an investigation of the possibility of introducing this method of manufacturing brass parts in the United States, where no such method existed at that time. To fully understand what most engineers and manufacturers in this country thought of die casting brass in 1930, one need only refer to an article by J. B. Nealey which appeared in December, 1929. In that he said, "It is, indeed, deplorable that the most useful non-ferrous alloys, the brasses, cannot be handled by this (die-casting), the most effective and economical method of forming."

Machines Placed in Operation

The results of the investigation of the Polak process were so encouraging that three machines were purchased and placed in operation in this country. Soon afterward two other installations were made and in each case the operating company was a manufacturer of brass forgings. This is one of the significant features and it is from the point of view of competition between brass pressure cast-

ings and brass forgings that much of the following data is presented.

The Polak Machine

The Polak machine operates with hydraulic pressures of between 3000 and 6000 lb. per sq. in., and it was this feature that made the process practical because it made possible for the first time lower casting temperatures. The brass is forced into the die cavities in a semi-molten or plastic condition rather than in the customary molten state. This allows the metal to be worked at a temperature several hundred degrees lower than would be the case if the machine were gravity fed. The lower working temperature makes the process economical because of the greater life obtained from the expensive dies. In actual practice the temperature of the brass is 1575 deg. F. (860 deg. C.)

Three sizes of machine are in operation. The small one, occupying 6 ft. by 5 ft. floor space and standing 6 ft. high, is shown on opposite page. On this machine with single impression dies, it is possible to produce several hundred pieces an hour. An eighteen-month study gives an average production of 136 pieces per hr. Speed

of operation will depend on how complex the design of the die is and whether there are cores to pull. The small machine will cast pieces weighing 10½ oz. The next size machine casts parts up to 1 lb. 5 oz., while a still larger machine will cast parts weighing 11 lb. The small machine has a normal water consumption of ½ gal. per operation. This is required for the closing and opening of the dies by means of an auxiliary cylinder of small diameter and for the locking pressure which is not applied until the die is closed, at which time a valve is opened allowing the water to enter the large cylinder, thus multiplying the actual pressure exerted upon the die.

The Die-casting Cycle

When the die is closed, the brass in a plastic or pasty condition, as stated, is ladled into the compression chamber where the sudden high pressure forces it into the die cavity. Immediately thereafter the remnant of metal is ejected. On opposite page is shown press operator ladling brass into the compression chamber. In one of the pans are the finished parts, and in the other may be seen the remnant. Simultaneous with the ejection of the

Castings Are Produced Economically

remnant the die is opened by hydraulic retroaction, all the cores being pulled automatically. As soon as the cores are pulled, the casting is ejected from the moving part of the die by means of ejecting pins. The complete cycle is diagrammatically explained on page 19. Power is supplied to the machines by one Smith A-Type three-plunger pump which operates at a working pressure of 1800 lb. per sq. in.

Composition of Castings

The brass may be melted down in any of the common furnaces, gas, oil, or electrically controlled. After the charge is melted, it is poured into a ladle and transferred to a holding furnace from which it is ladled into the casting machine. European practice is to use oil fired holding furnaces, but engineers in this country have found automatically controlled electric furnaces highly satisfactory. An electric holding furnace is shown below. Numerous analyses of pressure castings made in various parts

of Europe show considerable variation.

| EUROPEAN PRACTICE | | | |
|----------------------|--------|-------------|--------|
| Copper | 58.0 | per cent to | 62.00 |
| Lead | 0.25 | per cent to | 2.00 |
| Iron | 0.0 | per cent to | 0.75 |
| Tin | 0.0 | per cent to | 1.25 |
| Zinc | 41.75 | per cent to | 34.00 |
| | 100.00 | | 100.00 |
| FOUND BEST BY AUTHOR | | | |
| Copper | 60.00 | per cent | |
| Lead | 0.75 | per cent | |
| Tin | 0.50 | per cent | |
| Zinc | 38.75 | per cent | |

Considerable success has been experienced in casting a white metal alloy containing 16 per cent nickel and known by the trade name of Tinicosil. This alloy has a distinct white color, is highly resistant to corrosion, and has a tensile strength of 90,000 lb. per sq. in.

The fracture of a typical brass pressure casting is fine grained as shown in the accompanying photomicrographs taken at a magnification of 100 and 1000 diameters and which are compared with similar photomicro-

graphs of typical brass forgings and sand castings.

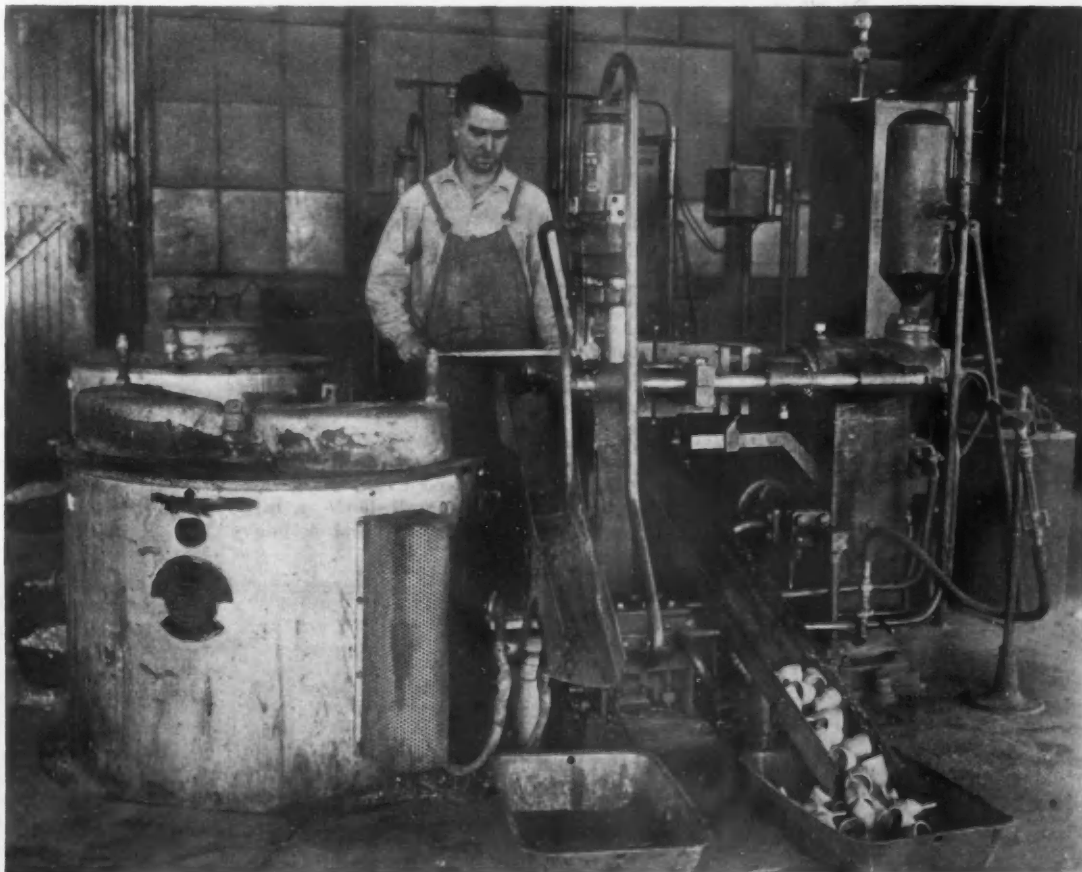
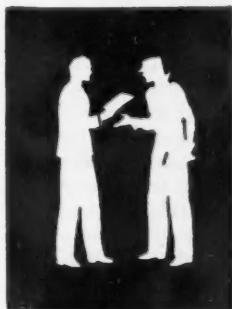
Test bars were cast to A.S.T.M. dimensions for zinc die cast test bars and were sent to the Pennsylvania State College where they were tested by Frank Gordon Benford. The results of these tests are as follows:

PHYSICAL PROPERTIES OF BRASS PRESSURE CAST TEST BARS

| Tensile Bar No. | Tensile Strength, Lb. per Sq. In. | Elastic Limit, Lb. per Sq. In. | Per Cent Red. In Area | Per Cent Elongation In 2 In. |
|-----------------|-----------------------------------|--------------------------------|-----------------------|------------------------------|
| 1 | 60,000 | 37,750 | 8.1 | 6.6 |
| 3 | 60,000 | 38,000 | 8.2 | 6.6 |
| 5 | 57,200 | 35,750 | 10.3 | 6.6 |
| 6 | 58,900 | 36,250 | 8.0 | 4.7 |
| 7 | 58,100 | 36,000 | 7.4 | 6.6 |
| 8 | 58,100 | 35,750 | 4.4 | 6.6 |
| 12 | 56,700 | 35,250 | 6.7 | 6.6 |
| 14 | 57,900 | 37,000 | 6.8 | 4.7 |
| 16 | 58,700 | 36,000 | 8.5 | 6.6 |
| Avge. | 58,400 | 36,417 | 7.6 | 6.2 |

Rockwell hardness readings were taken using B Scale, 1/16 in. ball and

This shows a typical arrangement of holding furnace and casting machine for hand operation. The operator ladles the semi-molten metal from the furnace into the compression chamber of the machine.



100 kilogram load. Surface readings were taken on the cylindrical surface of the rods and sectional readings were taken on a flat section cut about 1½ in. from the end of the test bar before testing.

| Bar No. | Hardness Reading | |
|---------|------------------|------------------|
| | At Surface | At Cross Section |
| 1 | 44 | 34 |
| 3 | 42 | 31 |
| 5 | 43 | 38 |
| 6 | 46 | 36 |
| 7 | 47 | 36 |
| 8 | 46 | 42 |
| 12 | 47 | 39 |
| 14 | 47 | 38 |
| 16 | 45 | 38 |
| Average | 45.2 | 35.8 |

The divergence in hardness is probably due to the more rapid rate at which the surface cooled.

Comparative physical properties of brass made by various methods are shown below.

Die Life

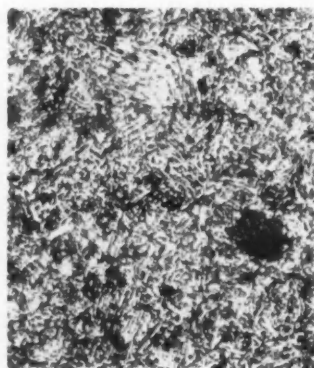
The dies for pressure casting brass are subject to extreme heat at high pressure and offer the alloy steel manufacturer a practically unexplored field to work in. At the present time semi-high speed steels are being used with considerable success, but are not all that could be desired by any means. The trouble is not with the breaking of dies, which does not seem to occur, but rather is due to heat checks which are quite prevalent. Stainless steels are being used experimentally, as well as austenitic steel containing high nickel and high chromium, but in general most of the dies are being made from steel within the following composition range:

| | |
|-----------|-----------------------|
| Carbon | 0.30 to 0.50 per cent |
| Silicon | 0.20 to 0.60 |
| Manganese | 0.20 to 0.50 |
| Chromium | 1.00 to 3.00 |
| Vanadium | 0.20 to 1.00 |
| Tungsten | 8.00 to 14.00 |

The greatest life so far experienced with die steel is 121,000 pressure castings made from a one-impression die. The average life per die impression is approximately 30,000 pressure castings. Naturally, the life of the die will depend a great deal on the shape of the part and on proper gating.

Porosity

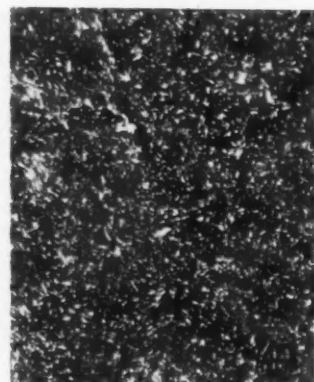
Brass pressure castings are subject to porosity in the same manner that zinc and aluminum die castings are subject to porosity. In this respect they are not as sound as brass forg-



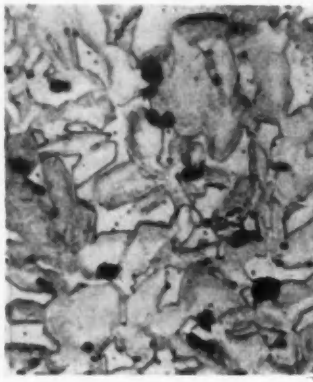
Brass Pressure Casting



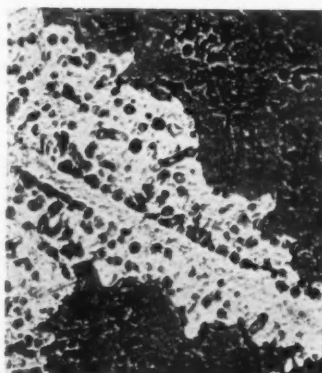
Brass Pressure Casting



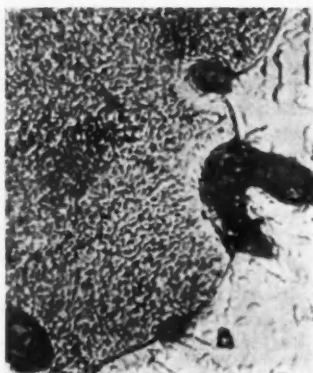
Brass Forging



Brass Forging
(Dark Particles Are Lead)



Brass Sand Casting



Brass Sand Casting

Comparison of grain structure of pressure cast, forged, and sand cast samples.
Magnification of photomicrographs in left column, 100 diameters; right column, 1000 diameters.

ings and should not be used where extraordinary water, gas, or air pressure is to be used. This tendency to form blowholes is one of the disadvantages of the process, but two years' experience has proven that these blowholes can be controlled to a large extent. They will be found in heavy

sections and seldom ever form in light sections.

It has been claimed that this porosity is caused by the fact that steel dies are airtight, and this is partly true. However, sound castings have been produced from gravity casting into airtight metal molds. Adolf Butner, factory representative of J. Polak, Prague, describes the formation of these blowholes as follows: "The main reason for the blowholes in die castings is the metal stream produced by the use of pressure. The metal shoots in the cavity of the die similar to the way water is delivered from a fire hose, or in the Pelton water turbine. The metal stream parting the cavity in two divisions is reflected from the walls of the die; whirls in the cavity and traps the air before it can escape from the die. It

COMPARATIVE PHYSICAL PROPERTIES OF BRASS

| Description | Tensile | | Per | | Rockwell | | Composition | | | |
|----------------------------|-----------------|----------|---------|------------|----------|------|-------------|-----|----|----|
| | Cent | | Elong. | | Hardness | | Cu. | Pb. | Sn | Zn |
| | Lb. per Sq. In. | In 2 In. | Surface | Cross Sec. | Surface | Sec. | | | | |
| Sand cast valve stem..... | 38,600 | 22.0 | B-25 | B-5 | 75.40 | 5.40 | 1.41 | Rem | | |
| Forged valve stem..... | 77,000 | 41.8 | B-70 | B-68 | 58.50 | 2.20 | ... | Rem | | |
| Pressure die-cast stem... | 60,000 | 6.6 | B-44 | B-34 | 60.10 | 0.70 | 0.52 | Rem | | |
| Hot rolled brass (hard)... | 67,500 | 5.0 | .... | .... | 64.5 | 0.30 | ... | Rem | | |
| Hot rolled brass (½ hard) | 52,500 | 15.0 | .... | .... | 64.5 | 0.30 | ... | Rem | | |
| Hot rolled brass (¼ hard) | 45,000 | 27.5 | .... | .... | 64.5 | 0.30 | ... | Rem | | |

happens sometimes that this metal stream comes back to the gate and traps the air before the cavity is filled up. The only way to prevent these air pockets is to prevent this type of flow from developing. This can only be done by proper gating and proper venting."

Experiments carried on by J. D. Grogan, and also by Dix and Keller, on zinc and aluminum die castings, proved to them that there were five reasons for the formation of blow-holes and these same reasons largely determine whether or not brass pressure castings are porous. They summarized the causes of porosity as follows:

1. Insufficient metal
2. Too low temperature
3. Insufficient pressure
4. Too small gate
5. Incorrect venting

It is felt that one other cause should be mentioned which can only be controlled from the engineering department in laying out the die, and that is improper gating. The problems of gating and venting must be solved largely by experience.

The surface finish is not as good as that obtained from a forging. Brass pressure castings require more finishing time prior to plating than forgings, but are considerably better than sand castings. In short, the finish on pressure castings lies between sand castings and forgings. The reason for the rough surface is due to heat checking of the dies, and a light scale which builds up on the die impressions during the casting process. This roughness will, no doubt, be better controlled as alloy steel manufacturers improve their die steels.

Economic Status

Brass pressure castings are superior to brass sand castings for the following reasons:

- 1.—The surface finish of pressure castings is better than the surface of sand castings.
- 2.—Machining tools wear longer without redressing, due to absence of sand in pressure castings.
- 3.—Pressure castings can be produced having sharper outlines and greater dimensional accuracy than sand castings. Intricate cored parts are readily produced.
- 4.—The pressure casting process is very well adapted to the production of castings having thin sections (0.060 in. minimum) which parts are very expensive to cast in the foundry, and which are impractical for forging.
- 5.—They are inherently small grained and have a strong structure, properties which give them a marked superiority over sand castings.

In many applications brass forgings have replaced sand castings, and replacement will continue in many fields with pressure castings replacing both forgings and sand castings. Of course there are applications where forgings will always be used and likewise there will always be a demand

for sand castings. Brass pressure castings will be used where sand castings quality is not good enough and where forging quality is better than the application demands. Aside from this they will be used where the other processes are not adapted economically for production of various parts. An example of this would be a part having quite heavy and quite light sections which would give trouble as a sand casting or as a forging. The Polak brass pressure casting process is well adapted for the production of such parts.

Brass pressure castings compared with brass forgings bring out the following interesting points:

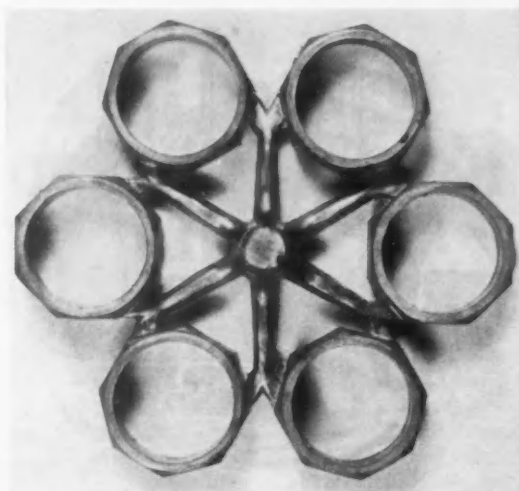
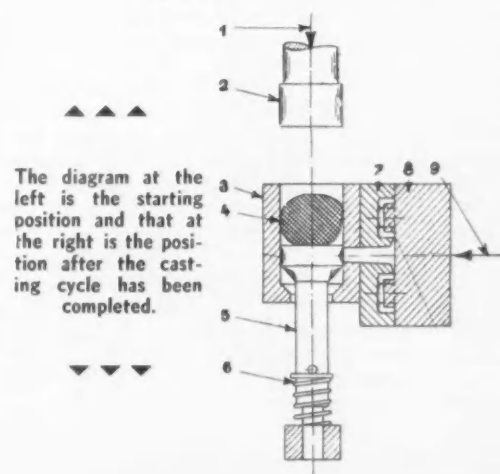
- A.—Brass pressure castings can be produced with less operations than forgings, the various steps in production for both processes being as follows:

FORGING PRODUCTION

1. Weighing charge
2. Melting charge
3. Casting ingots
4. Sawing ingots
5. Heating billets
6. Extruding billets into rods
7. Sawing rods into slugs
8. Heating slugs
9. Forging
10. Trimming flash from forgings

PRESSURE CASTING PRODUCTION

1. Weighing charge
 2. Melting charge
 3. Transferring to holding furnace
 4. Casting parts
 5. Removing small fins
- B.—The production of pressure castings results in a defective scrap loss of between 7 and 10 per cent as compared with 3 to 5 per cent with forgings. In sand castings reliable information places defective scrap at between 10 and 15 per cent.
- C.—More intricate parts can be readily produced by pressure casting than by forging. Fig. 5 shows a group of pressure castings and illustrates the complexity of parts which it is possible to produce.

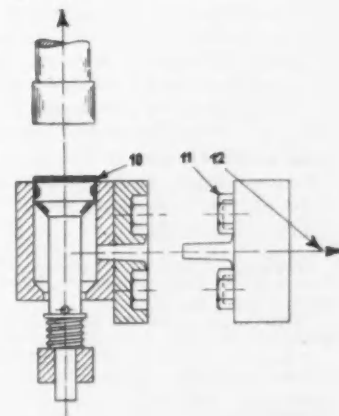


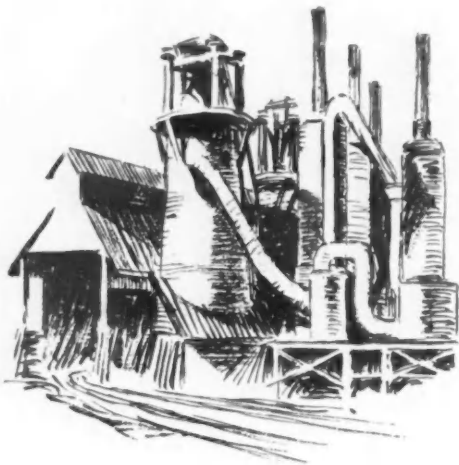
Gates of 6, 8, 10 or more pieces are successfully pressure cast.

- D.—There is very little difference between the rate of machining brass pressure castings and brass forgings.
- E.—As previously noted, the forging surface is better than the pressure casting surface.
- F.—Brass pressure castings and brass forgings both show a very fine structure, but the forging is the stronger of the two, and is the more reliable material from an engineering viewpoint.
- G.—Pressure castings are produced closer to size than forgings and less draft is needed, resulting in less material to remove in second operations, such as reaming to size.
- H.—Fig. 6 shows six pressure cast nuts attached to the gate. A study of the scrap produced in making this part as a pressure casting and as a forging is quite interesting, keeping in mind the fact that only half as many operations are necessary to produce the nuts.

Finished forgings per 1000 lb. charged in furnaces... 490 lb.
Finished pressure castings per 1000 lb. charged in furnaces... 475 lb.

- I.—It is possible to cast threads on brass pressure castings and it is, also, possible to forge threads on brass pressure castings. In both instances it is not regarded as practical, due to die difficulties, and the fact that modern machinery is so designed that second operation threading of parts is more economical.





... Crux of the Fuel Economy

By H. A. SPALDING

Mining Engineer, Hazard, Ky.

DURING the last 50 years the blast furnace has been steadily improved and enlarged physically. More efficient operation generally has resulted. The average furnace of today probably has a daily capacity of upward of 500 tons and stacks of more than 1000 tons output are in operation. Still larger units than any now constructed are proposed.

That the average modern furnace is more economical of fuel than the smaller one of a generation or so ago is admitted without argument. But as hearth diameters and outputs have increased it has been occasionally observed that unit fuel consumption in some of the larger stacks has sometimes exceeded that of some of the smaller. An understanding of all factors that will lower costs or preserve natural resources for future generations is vital to so practical an art as iron smelting. Comment and speculation on the reason for the failure of some of the larger furnaces to attain the fuel economy of the smaller ones may, therefore, be of interest.

Stresses Unit Rate of Gasification

That furnaceman extraordinary, the late J. E. Johnson, Jr., has stated¹ that the driving rate is dependent, not so much on the hearth area, as it is on the unit rate of gasification, such as the amount per cubic foot of the combustion zone. He defined the combustion region as the space from the tuyere plane to well toward the top of the bosh. Disregarding the idea of inherent differences in coke combustibility, the unit rate of gasification is largely governed by the pressure of the oxygen supplied by the blast. Johnson's thought evidently

¹Johnson, J. E., Jr.—Principles, Operation and Products of the Iron Blast Furnace, New York, 1918.

²Korevaar, A.—Combustion in the Blast Furnace and Gas Producer, London, 1924.

³Clements, F.—Blast Furnace Practice, 3 Vols., London, 1929.

⁴G. St. J. Perrott and S. P. Kinney—Combustion of Coke in Blast Furnace Hearth. Trans. A.I.M.E. Vol. LXIX, p. 543, et seq. Kinney, Royster and Joseph—Iron Blast Furnace Reactions. U. S. Bureau of Mines, 1927.

was that if all base conditions, such as volume of voids, character of burden, blast, grade and size of coke and so on, were the same, then combustion and therefore production should proceed at about the same rate in different furnaces if blown with air at the same rate per unit of volume.

Heat Compression

Other factors should be considered. Since the entire blast furnace process is not so much one of reduction as it is heat production, quality of heat in the hearth is quite as important as quantity. Korevaar, in his study of the fundamental action of the blast furnace has formulated "The Law of Heat Compression."² This is a new theory and while fairly complicated in detail, is easily understandable in a general way. Although it has not been widely discussed or investigated to the extent that it may merit, from the extended references, both as to theoretical and practical phases, its validity is evidently accepted by the author³ of the most recent and complete treatise on blast furnace practice extant.

The theory demonstrates that it is possible to produce by burning fuel at a more intense rate within a given volume or space, such as per cubic foot of combustion zone, a higher temperature with a given fuel consumption, or what amounts to the same thing, that it is possible to sustain the same temperature with a smaller fuel consumption. By burning a quantity of fuel, F , at a given and constant rate within a closed and insulated space, such as the blast furnace hearth, some definite temperature, T , will be attained. If the factors are so increased that a larger quantity of fuel, F_1 , is gasified per unit of time, thus liberating more heat in the same space, some higher temperature, T_1 , will be reached. Radiating and conducting influences are more constant, so a simple expression for the compressed heat effect, proposed by the writer, is:

$$T_1 = T \times \frac{F_1}{F} \times k$$

k being the reactivity constant of the fuel.

Since the rate of combustion is mainly a function of the available oxygen, a furnace on slack or "slackier" wind, burning less fuel per unit of volume of combustion zone per unit of time would lose the effect of this increased intensity of heat, compared with one having a higher combustion rate. As the area of a furnace varies as D^2 while the radiating surface varies only as D , D being the hearth diameter, the total loss of heating effect to a large hearth as compared with a smaller one obtaining this effect would be enormously large. Moreover, most of this increased intensity, or compressed heat effect, is applied above the "critical temperature." As a certain thermal equilibrium must be maintained, in the final consideration this would mean for the same set of conditions and proportionally lower wind, a greater fuel consumption for the larger unit.

On the other hand, when proper conditions obtain to create the compressed heat effect, which are mainly ample wind at uniform pressures, since luminosity, conduction and so on also vary as D^2 , the advantages should be correspondingly greater for the big stack. So long as hearth heat demands are met direct reduction will mean fuel saving by the greatest use for reduction purposes of the CO generated at the tuyeres; the greater the portion of this necessary hearth heat met by the compressed heat effect the further can Greuner's Ideal be departed from with consequent fuel economy.

Globular Regions at the Tuyeres

This does not mean that combustion takes place uniformly throughout the hearth and bosh. As a matter of fact conditions are considerably modified. As has been demonstrated by the investigations of the Bureau of Mines and others, gasification does not proceed uniformly throughout the hearth and bosh, but in more or less local and globular shaped regions in front of the tuyeres.⁴ Thus the necessary blast volume does not vary so

Economy of Blast Furnace Operation

much as the hearth area or the volume of the bottom portion of the stack, but more as that of this most active region of gasification.

These individual zones merge roughly into a ring before the tuyeres about the periphery of the hearth. For equal fuel economy in the large and small furnaces with the same base conditions, it would appear that the volume occupied by the ring or space of most active combustion and consequently that of the greatest heat generation, should be proportional. If this condition is met, barring physical uncertainties, should not fuel economy be proportional or better in the big unit?

Considering the zone of active combustion more in detail, the individual volumes before each tuyere are roughly spherical, with a diameter of $d = cD$

Based on observation and all experimental data available, the active combustion area seems to extend inward from the tuyeres a distance between $0.10D$ and $0.20D$ in American practice, as an average. Thus c would have a value of between 0.10 and 0.20. Assuming a value of 0.20, since the actual individual zone is practically globular, the area of active gasification in the combustion ring should occupy upward of 60 per cent of the hearth area for a height of about $0.20D$ above the tuyeres. As the volume of a sphere varies as d^3 , to blow one furnace at the unit combustion zone rate of another making the same iron, with the same relative dimensions and shape, the quantity of wind necessary would appear as

$$d^3 = (cD)^3$$

or for average American practice

$$d^3 = (0.20D)^3$$

This agrees closely with Johnson¹ and may be more exact. Within limits proportionally more wind will tend to increase d , forcing the inside of the combustion ring inward, and considering the furnace a unit volume, "compressing heat," with variations, of course, for local and physical conditions, such as, for instance, different tuyere arrangement.

Manifestly then, furnaces with comparable base conditions, with variations in the volume of combustion space, may be expected to show variation in fuel consumption. The suggestion to furnaces, especially big

WHY the fuel consumption of larger blast furnaces sometimes exceeds that of smaller stacks led the author to speculate on what takes place in the combustion zone. He is of the opinion that economy of fuel may be owing more to getting the right amount of oxygen "properly" to the fuel than to any other one factor.

ones, with fuel consumption out of line, is obvious.

Much has been written and more has been said considering the effect of coke ash on fuel consumption and the furnace process generally. While the factors are so inextricably linked that no particular phase can be adequately considered alone, it may not be amiss to consider the effect of ash in the light of what has been set out.

Taking the proposed expression for the compressed heat effect

$$T_1 = T \times \frac{F_1}{F} \times k$$

If the fuel factors F and F_1 be taken as the actual amount of available carbon, for any fixed quantity of coke the ash present will tend to decrease the unit volume quantity of available fuel by occupying space and so decrease the amount that can be burned per unit of space per unit of time. This in turn will tend to decrease or shrink the size of the hottest region, because the dilution by inert matter will lower the zone temperature and decrease reaction. Thus would variation of the actual fuel available in either of the factors F and F_1 affect the furnace process. The same effect

would be true for two furnaces with otherwise comparable base conditions.

The old question regarding the elusive and mysterious properties— inherent combustibility and reactivity of coke—which would give k a value remains. Many furnacemen subscribe to the idea that such a property exists; others are uncertain. Most all agree that it is probable that any such properties are physical rather than chemical. A few are coming to the conclusion that any such qualities may be the result of sales propaganda of gentry with coke for sale. May it not be that the entire matter is more basically one of getting the right amount of wind to the fuel, properly?

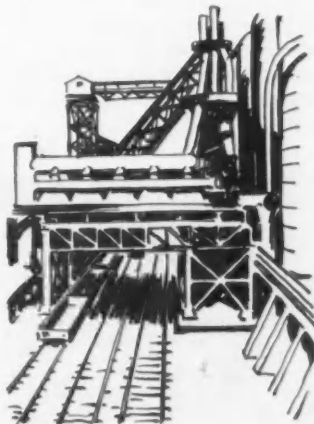
Malleable Institute To Continue College Aid

EDUCATIONAL facilities in behalf of the malleable iron industry provided in the various technical schools and colleges during the last school year through the cooperation of the Malleable Iron Research Institute proved so beneficial that the institute, at a meeting in Cleveland, Nov. 15, decided to render the same service to these institutions during the current school year.

During the last college year 71 institutions availed themselves of the offer of the institute and these were supplied with over 6000 test bars and test specimens of malleable iron. In addition they were supplied with numerous castings for exhibit and instruction purposes.

Early this year the institute prepared a paper entitled "Malleable Iron a Typical American Product," and offered to have this paper presented to institutions interested by representatives of companies belonging to the institute and qualified to discuss the subject. Although the offer was not made until April 15, 20 schools took advantage of it and had the lecture presented. This was illustrated by 32 lantern slides.

The institute has now decided to furnish a copy of this paper to the heads of the metallurgical and mechanical engineering departments of technical schools to incorporate in their courses of instructions. In this way the paper will become text book material to be used from year to year and it is expected to have broader use than if its presentation were limited to a single lecture.



¹Johnson, J. E. Jr.—Work cited, p. 111.



Economics of Planing/er

GENERAL ELECTRIC records indicate that up to about 30 years ago our average machine shop listed fully as many planers as milling machines in its complement of equipment. About 25 years ago an engineering development was announced which substantially increased the efficiency of planers—this was the invention of the reversing motor drive as distinguished from the conventional cross-belt drive. The great advantage of this device was that a planer table might be reversed at a much more rapid rate, thus making a complete cycle in a greatly reduced length of time.

Our records indicate that, starting in 1916, one job after another was transferred from a planer to a milling machine. This condition, however, applied principally to planers of about 6 ft. capacity and smaller. Milling-machine manufacturers have developed their product to a high degree of efficiency, so that a prospective purchaser now has his choice of any one of several definite types, each of which offers certain features not to be found in any of the others. Probably one of the chief reasons for the rapid development which has taken place in the milling-machine field was the general demand made by automobile manufacturers for more productive machine tools. Other industries of a more general nature have quite obviously benefited to an extent which would hardly have been possible were it not for the incentive offered by automobile plants.

The improvement made by milling-cutter manufacturers in the design and construction of their product to suit specific requirements has contributed substantially to the art of milling. Metallurgical advance in the cutting quality of tool steels is reflected somewhat more through the use of milling cutters than single-point planer tools.

There is no questioning the fact that a planer is still a very important factor in general machine-shop practice under present-day conditions. In the construction of large turbines, single parts, usually castings, of tremendous volume and peculiarity of shape, must be machined, and a careful cost analysis frequently indicates that planing is more economical than milling. It is obvious that wherever both planing equipment and milling equipment are available an accurate

analysis must be made of all factors involved in each individual job before it can definitely be asserted that either might be used to advantage over the other.

In attempting to determine the true economics of planing as compared to milling, proper consideration must be given three important conditions: (1) nature of work; (2) machine operation and maintenance; (3) tool and fixture costs and maintenance. Moderate size pieces present a more difficult problem than do large or small pieces. Shapes or parts well adapted to planing are those with flat surfaces where the cutting tool might be engaged in the work at least 75 per cent of the cutting stroke. Milling is usually more economical on flat surfaces, particularly those located at intervals, such as bosses, pads, etc.

Quantity of parts to be produced determines to a great extent the advisable selection of method of machining. Only through a careful cost analysis can it be determined whether a milling machine, with a lower direct labor cost but with a higher attendant tool cost per piece produced, or a planer, where exactly the reverse is the case, is the more economical machine to use. It is difficult to visualize a condition where milling might be proved more economical solely on the basis that the part in question has but a small amount of stock to be removed.

The nature and characteristics of material of pieces being machined are very important factors. Castings containing hard spots, blowholes, or sand inclusions usually have a more destructive effect on a single-point planer tool than on a milling cutter.

In General Electric practice it is felt that an efficient milling machine and milling cutter set-up will produce a sufficiently high quality of surface finish as to be entirely acceptable from an engineering standpoint for all but



▲ ▲ ▲
A SYMPOSIUM on planing versus milling will be staged by the machine shop practice division of the American Society of Mechanical Engineers at the Engineering Societies Building, New York, on the afternoon of Dec. 5. The accompanying articles are digests of the papers then to be presented as the basis of general discussion.
▼ ▼ ▼

a few special cases. In the operation of one or more single-point tools in a planer more attention is usually required to tools and tool setting than is the case in milling-machine operation.

A set-up for milling small-quantity work, where special clamping fixtures are not justified and for work of irregular shape or light sections, would be substantially more elaborate than for planing. Our experience in such cases indicates that provision must be made for holding work against greater strains in milling operations. In planer operation, however, an increase in weight of pieces to be machined necessitates greater security in clamping in order that the work may be rigidly held against the developed forces of inertia. This is particularly true where a heavy cut is taken at high speeds.

Milling-machine operating maintenance is much more complex and costly than that of a planer.

Comparative costs for fixtures for pieces that are adapted to either planing or milling should be essentially the same. Our experience indicates, however, that a milling fixture should be somewhat stronger and more rigidly constructed.

The cutting-tool cost for a planer is insignificant compared to cutter cost for operating a milling machine. Reconditioning a planer tool is a comparatively simple matter and is usually done by the operator. Milling cutters, on the other hand, must be reground by skilled mechanics, usually employed solely for that purpose.

A careful survey of General Electric conditions reveals the fact that many jobs have been transferred from a planer to a milling machine, but in

Planing versus Milling

By A. C. DANEKIND
General Electric Co., Schenectady, N. Y.

no single instance do our records indicate the changing of a job from a milling machine to a planer for purely economic reasons.

The greatest single recommendation

for the operation of a planer today is its broad flexibility, and for that reason, if for no other, it will always be a real factor in general machine-shop practice.

constant, and the cutting tool operates at a constant 100 per cent efficiency. No such accurate load control can be applied to a reciprocating planer.

On account of the number of cutter heads, and the multiplicity of blades operating in each head, say four heads each employing a cutter with 30 blades, we have 120 cutting tools. Only the applied horsepower limits the rate of metal removal. In such a case it is not unknown to employ usefully more than 100 hp., removing metal at a rate in excess of 300 cu. in. per min.

Recent investigations have brought to light some remarkable tooling costs applicable to heavy-duty milling in cast iron of medium hardness. A type "A" milling cutter will remove 6000 cu. in. per grind and can be reground 70 times. In view of the fact that a set of blades for this cutter costs the user \$20.80, 200 cu. in. of metal can be removed for one cent invested in high-speed steel.

With a cutter of type "B" which has an actual metal-removal life of 1,620,000 cu. in. per set of blades costing the user \$28, a volume of 578 cu. in. of cast iron can be removed for one cent invested in high-speed steel.

The Case for Milling

By R. E. W. HARRISON
Mechanical Engineer, Cincinnati

IN mechanical processes the observer is struck by the trend to convert designs which originated with reciprocating cycles to designs which operate with rotary cycles; numerous examples can be cited. Workshop processes have not been exempt from this scheme of orderly evolution, and it was a perfectly natural trend asserting itself when the milling machine was born and its parent, the planer, began to give ground to the newer and more economically attractive tool.

Broadly speaking, the milling machine has almost completely displaced the planer on small work; it has made deep inroads on the work of medium weight; and on heavy work, in the majority of cases, it is only the existence of previously bought heavy planing equipment, the investment in which having been to a large extent amortized, that prevents the adoption of the newer process.

Work-Handling Facilities

On small work, the slower table motion of the milling machine often permits work to be loaded and unloaded while the cutting tools are functioning, thereby reducing idle or non-cutting time to a minimum, particularly on manufacturing operations. In some instances the ratio of cutting to idle time will reach 9 to 1, whereas in normal jobbing-shop operations the ratio is generally 3 to 7.

Rates of Metal Removal

There is, of course, a decided advantage in the case of the milling machine in that there is no idle return stroke. Furthermore, by using a cam-

controlled variable feed rate, it is an easy matter to keep the cutter working up to its maximum capacity, irrespective of the varying area of the cut. In other words, if a combined machine, job, and milling cutter are capable of operating at, say 15 hp., and this particular combination will stand up indefinitely at a metal-removal rate of 2 cu. in. per hp. applied, or a total of 30 cu. in. per min., the feed rate during the cutting portion of the work cycle can be so controlled that the load on the motor is

The Case for Planing

By F. E. CARDULLO
Chief Engineer, C. A. Gray Co., Cincinnati

IN comparing the planer and the milling machine, we should compare only machines of modern design. Most planers and many milling machines now in use are of obsolete de-

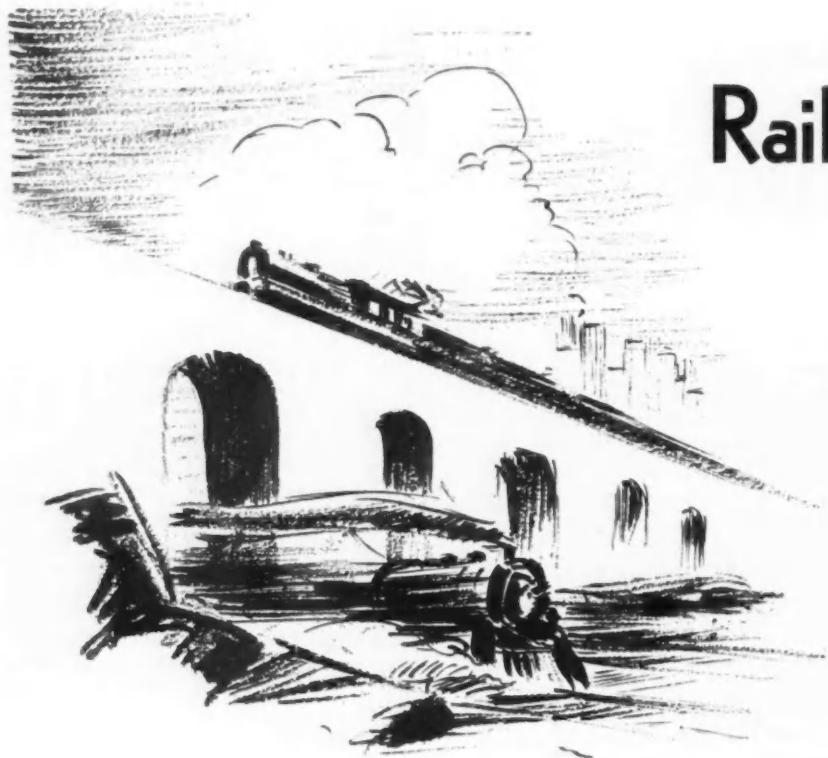


sign. Under favorable conditions, a planer of medium or large size will remove metal from work of suitable size at a faster rate than a milling machine, and less work is expended in removing the metal, because tools of better form may be used, coarser feeds may be employed, the planer tool does not distort the chips as much as the milling cutter, it does not cut the chips into fine pieces, and it does not abrade the work with the chips. When the finish is scant, or when a relatively small proportion of the surface of the work is to be finished, the planer usually works at a disadvantage, using more power and doing the

(Concluded on Page 72)

Rail Buying in Two Decades

By ALVIN I. FINDLEY
Editor Emeritus, The Iron Age



WHAT a Rip Van Winkle experience it would have been for those who led the steel industry in the days of the old rail pool to have sat among the negotiators in the recent collective bargaining on rails at Washington. Imagine Andrew Carnegie, John W. Gates of Illinois Steel, Walter Scranton of Lackawanna, Major L. S. Bent of Pennsylvania and Maryland Steel, and Powell Stackhouse of Cambria journeying to the national capital to talk over prices on a million tons or more of rails and fastenings. And there, sitting on the other side of the table, to find—not a group of presidents of the country's great trunk lines, but the President of the United States, and with him a Federal Coordinator of Transportation, whatever that might have meant to them!

No end of contrasts between then and now come to mind. But as I have followed in recent weeks the developments in this latest chapter of our kaleidoscopic steel history I have been struck by an outstanding coincidence. And that is that just as rails have had the center of the steel stage in this fifth year of the depression that dates from the crash of 1929, rails likewise furnished a most sensational episode in the fifth year of the depression that started with the panic of 1893.

Back there, as rails went so went the industry. Whereas in the years just before the present depression—1926-28, let us say—rails averaged only 7 per cent of the total of finished steel products, they were 25 to 30 per cent, and even more, of the total steel production in the old rail pool days. Hence the war in the rail trade that

broke out early in February, 1897, made a sad hole in earnings statements for that twelve-month, coming on the heels of four lean years.

In its market summary of Feb. 11, 1897, **THE IRON AGE** thus broke the news:

The one event of overshadowing importance during the week has been the rupture of the famous steel rail pool. The Lackawanna company [then at Scranton, Pa.] withdrew on Friday last, because the agreement was not being lived up to. The result has been that practically all the leading roads in the Eastern territory have placed their orders, the price being \$20 per ton. In the West, for a short time, there was a movement to fix \$20 as the price at Pittsburgh, and \$21 at Chicago, but on the same day large sales were made in the latter market at \$17. For the present the struggle in the East is practically over, but it is still raging in the West. That a very large tonnage has been placed is certainly true, but it is difficult to estimate the total. The effect upon the rail mills themselves is, of course, very serious, but nearly all of them are financially very strong. The outside mills who were promised handsome subsidies lose that source of revenue.

One week later, in the issue of Feb. 18, **THE IRON AGE** said:

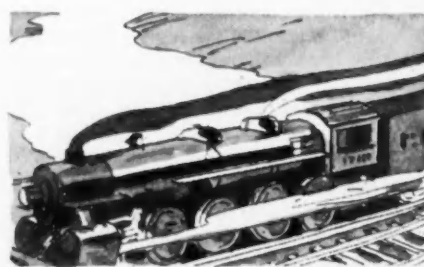
After some hesitation the iron trade seems to have come to the conclusion that the general situation has been considerably improved by the drop in steel rails and the heavy tonnage in orders placed by the roads. The magnitude of those orders has been the subject of much guessing. Conservative men in the trade put the total at about 800,000 tons for East and West in domestic business. The prices at which this business has been done have varied within very wide limits. There can be

no doubt that on competitive business, particularly in the West, the net prices at mills must have been very low. . . . By far the most interesting development of the week has been that reported by our Pittsburgh correspondent, who notes export sales of rails aggregating 100,000 tons. This includes sales of 25,000 tons each to the London & Southwestern and the London & Northwestern, also a lot of 11,000 tons for Japan.

Secretiveness on market matters ranked high with the steel masters of the eighteen-nineties. For over against the above "conservative" estimate of 800,000 tons closed while the battle of 1897 was raging, the Chicago market editor (the late George W. Cope) reported in the issue of Feb. 18 that 500,000 tons had been sold at Chicago alone, adding that "it is estimated that the tonnage booked throughout the country since the disruption of the rail pool has been at least 1,500,000 tons."

It is fair to say that the present-day state of the art of steel market reporting and the broader views of present-day steel men on publicity would have given us a much more detailed and accurate history of that eventful February.

Reference was made above to the leading place of rails among steel mill products in the eighteen-nineties. No less than 15 companies were parties to the formation of the old pool in 1887, whereas only four made bids last month to Coordinator Eastman, and steel capacity today is four or five times the average of the 'nineties. In 1896, the year of the Bryan free-silver campaign, railroads were scant buyers. At a rail pool meeting, late



Two Depressions a Lesson

in Industrial Enlightenment



in 1895, the steel company presidents made estimates of rail requirements for the following year. These ranged from 1,800,000 to 2,600,000 tons. The actual tonnage in 1896 was 800,000. There were stormy meetings, as the allotments for 1897 came up. Outside mills were growing in number and in insistence on their price for staying out of the market. Something like \$1,000,000 was to be paid for the suppression of such capacity. Allotments were finally patched up. But as January passed with no orders closed, hungry mills could no longer be restrained. It was a sanguinary struggle. Customers that had been continuously on the books of a mill for years were taken away from it by deep cuts from the \$28 price the pool had maintained. While \$20 was done in the East in the first week of the break, Middle Western mills a few days later went to \$17 and as low as \$15 was done as Carnegie and Illinois Steel battled desperately for the lion's share of the business west of the Alleghenies.

That \$15 price rose up in later years to plague the rail makers, as radical Congressmen attacked the "steel barons" who asked for a rail tariff. But these critics carefully omitted to say that the \$15 rail price of 1897 went with \$1 a day, and even 90 cents, for common labor in the same year.

Though not a few steel salesmen of today have heard the story from their seniors, Charles M. Schwab is probably the only survivor among the leading participants in this historic war of 1897. He was then next in line to Henry C. Frick in the Carnegie or-

RAIL prices have figured in sensational episodes in the fifth year of two depressions. Only recently rail prices were reduced twice as a result of Government pressure. In 1897 rail prices were sharply lowered as a result of the collapse of the "rail pool." A study of selling practices in the steel industry in the years following the 'nineties reveals marked progress toward enlightened cooperation. The steel code was anticipated years ago by the program conceived by Judge Gary, which emphasized the common rights of consumers, workers, stockholders and the public. Code cooperation, if harassed by bureaucratic control and petty disciplinings, will not last, in the author's opinion. But self-regulation by the industry itself, under friendly, not hostile, supervision by Government will follow.



ganization. Mr. Carnegie for some years had lived in New York, whence he sailed with each returning summer for his retreat among the Scottish lakes. He was often a party to agreements or pools, particularly in rails, billets and structural shapes, but was always outspoken in his disbelief in them. Granting that they might serve a temporary end, he did not hesitate to break away from them when leanness came upon the market. On all such occasions his maxim was that the way to lift the market was to get under it.

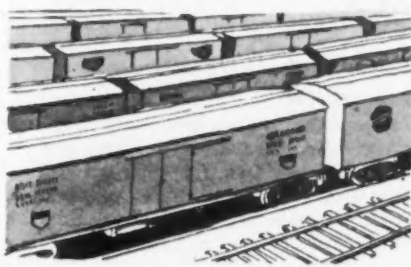
I well recall that when this 1897 break in rails came Mr. Carnegie took a train for Pittsburgh and sat at the head of the council table, with his "young partners" about him, directing the strategy of the campaign in the West. As THE IRON AGE said at the time of his death in August, 1919, "Though in all the years of his power Mr. Carnegie relied upon a group of able and active partners to bear the burdens of the struggle, he alone made

the decisions in hours of crisis. His control of the organization was complete and his sway absolute."

Out at Chicago, directing the battling rail forces of the Illinois Steel Co. in that momentous February, sat John W. Gates. In the midst of the depression of 1893-98, after a meteoric career in the Western wire industry, in which Lambert, Ellwood and Edens were his contemporaries, he had come to the presidency of the big company which furnished steel to the producers of wire. In respect to the heavier products his main reliance was upon a young vice-president of Illinois Steel, the late William P. Palmer, whom he had taken from the Carnegie partnership a year or more before the break in rails.

Though the personal factor in the steel trade rivalries of the last generation never figured in market reports, it more than once whetted the edge of competition. It was no secret that in the rail war of 1897 the Western railroads were beneficiaries of an animus that for some time had marked the competition of the Carnegie and Illinois companies. The Carnegie company had been a heavy buyer of Bessemer pig iron in the "soda water rise" of 1895, that in some steel trade quarters was mistaken for the beginning of the end of that depression. The price advanced rapidly. A prominent merchant firm at Pittsburgh sold Carnegie a large block of Bessemer iron. Eventually it became known that a good part of this was either speculative iron Gates had bought at an early stage of the rise or that it came from the blast furnaces of the Illinois Steel Co. The market reacted quite as precipitously as it had risen, with the result that deliveries of high-priced Gates iron to Carnegie were still being made when Bessemer iron was selling at dollars a ton below the original contract price. The Carnegie reprisal was represented in the rail orders—not one nor two—formerly placed with Illinois, which the February bargain sale landed on Edgar Thomson books.

As the shining example of the policy of running to full capacity, whatever



happened to competitors, the Carnegie partnership made money, even at the slaughter prices of '97, though the public got no inkling of its balance sheet. Not so with the Illinois corporation. Its published statement showed a very considerable loss.

That this gave Mr. Carnegie no pangs appears from a letter I received from him in April, 1899. He had just agreed, for a consideration of \$1,000,000, to give an option on his holdings to Henry C. Frick and the Moore Brothers, when the three attempted, though unsuccessfully, to form a consolidation of Central Western steel interests that should take in also the National Steel Co. (itself an early consolidation) and the related hoop, sheet and tin plate consolidations that had been put through by the Moore Brothers.

In this letter, which he evidently intended for publication (though I did not publish it until after his death, 20 years later), Mr. Carnegie railed at consolidations, adding that some of them would not pay their bonded interest. (Hardly encouraging to the bankers with whom Frick and the Moores were negotiating, had it been published.) "The present craze for consolidation in the iron and steel business," the letter read, "is due to the fact that manufacturers for a long time have been doing business at little or no profit and they are glad of the opportunity to sell out. *Some of them, as we see by their statements, lost money in 1897.* And in disposing of their properties some of the older and wiser heads are doing well to look out for the future."

The sentence I have italicized was evidently Mr. Carnegie's reminder to whom it might concern that—for his competitors—a price war with him was no exception to Sherman's idea of cannon war.

* * *

My thought, in harking back to this rail market raid of the old pool days, is to show how great an advance the steel trade has made, on its own initiative, from the code of Carnegie and his contemporaries. What a forbidding contrast between this typical record of destructive competition in its full flowering, and on the other hand the constructive work of Gary and his compeers in the American Iron and Steel Institute, in a quarter century of cooperation within the industry.

Much has been and will be written of the "revolution" wrought by NRA in various departments of American business. But so far as steel is concerned the New Deal is in large part putting the authority of the Government behind a code and program conceived years ago by Judge Gary. That code went even beyond NRA in moral purpose and telling heraldry, for beside the eagle which its 'scutcheon carried were blazoned "Cooperation" and "Right Makes Might."

Over and over, in the public meet-



ings of the Institute, it was declared in effect that its platform rested on four pillars representing respectively the rights of consumers, workers, stockholders and the public. Judge Gary was more a prophet of an NRA regime than he was credited with being when he urged that the Government, through the Department of Justice, the Federal Trade Commission, or other agency, tell the steel manufacturers what they might do within the law in their effort to be fair to

labor, to buyers of steel, to the public and to investors in steel securities.

Today, instead of the voluntary cooperation at which the steel industry so long has aimed, we have cooperation under Government compulsion. Plainly the present regime, with its bureaucratic control and petty disciplinings, will not last. Self-regulation by the industry itself under friendly, not hostile, supervision by Government will follow, if the Administration at Washington can read aright the lessons of these recent months of overturning.

After 25 years of drawing together and of unlearning much that had been handed down from their predecessors, the present-day leaders of the American Iron and Steel Institute are well able, and should be willing, to carry on under the Swope plan or any other plan that corrects the defects of the NRA and that encourages rather than penalizes initiative and progress.

Controlled Carbon Steels

"CARNEGIE controlled carbon steels" have been announced by the Carnegie Steel Co. The term is a new one and represents a practice instituted by the company to guarantee a product that fully meets the requirements of the purchaser. In short, manufacturing procedure is now made subject to closer surveillance all along the line in recognition of the fact that the control of all quality factors including inherent grain size is fully as important as close adherence to chemical specifications. The company believes it has solved a problem that has heretofore been baffling, namely, a lack of uniformity in steels of approximately the same chemical analysis.

These controlled steels are produced in the basic open-hearth process. To explain the lengths to which the company has gone to solve the problem and produce steel of uniform characteristics, a copiously illustrated booklet has been prepared for general distribution. In this booklet it is shown that the studies have called for research over a considerable period of time on the part of its own metallurgists and engineers together with a utilization of the facilities and findings of the research laboratory of the United States Steel Corp. at Kearny, N. J. The Carnegie contribution may be taken as another illustration of the acceptance of the truism that the user is less concerned with the chemical make-up of his raw material than he is with its adaptability to his fabricating needs.

In discussing the fact that occasionally a steel, though of the chemical composition specified, does not respond to heat or mechanical treatments in the manner to be expected, or does not possess the anticipated

physical properties, the company agrees that variations from proper steel expectancy may be encountered not only in different heats of the same composition but even in different parts of the same heat. These variations may manifest themselves by a noticeable dissimilarity in behavior in one or more of the various processing stages, as in cold working; in forging; in heat treating, including width of hardening temperature range, sensitivity, uniformity of hardening, degree of warpage, tendency to crack, and variations in heat-treating time cycles.

If these variations in steel of proper chemical composition occur in different heats or in parts of the same heat, it is practically impossible, under present conditions of mass production and heat-treating methods, to devise any one procedure that will apply to the steel as a whole to insure the uniformity necessary to the finished product. Solving such difficulties by varying chemical composition has been the favorite method, but juggling specifications is frequently of no avail, particularly in the light of more recent knowledge of the many other fundamental factors which have a pronounced effect on the characteristics of the steel. Other lines of attack, such as non-metallic inclusions and acid etch tests, are useful but not adequate, says the company.

Austenitic Grain Size Important

One of the important fundamental factors that affect the characteristics of steel, particularly that which must be subjected to carburizing or heat treatment, it is pointed out, is austenitic grain size as determined by the standard grain size carburizing

(Concluded on Page 72)

New Things in Materials and Processes

By EDWIN F. CONE

Beryllium As An Alloy in Steel

A VALUABLE contribution to the literature concerning the rare metal beryllium and its use metallurgically is found in a paper before the Iron and Steel Institute (London) by those two well-known British metallurgists, J. H. S. Dickenson and W. H. Hatfield. The title of the paper is "The Influence of Beryllium in Steel."

It is not the purpose here to review the paper but only to comment on one or two striking features of the authors' findings. They hold there is "little or no prospect of the element beryllium becoming a useful addition to the group of metals used in the manufacture of special steels." That it is "extremely expensive" and "unlikely ever to become reasonably cheap" as well as so light and so readily oxidizable that its introduction into steel is difficult and wasteful must be discounted as to the future. Similar difficulties have been overcome with other rare elements—vanadium, molybdenum, zirconium and so on—and there is always the probability that, once a rare element is demonstrated to have value as an alloy in steel or otherwise, defeatist objections will be overcome by the skill of research metallurgists. This is being demonstrated in this country at present in the case of the beryllium-copper and the beryllium-nickel alloys.

One notable item of the Dickenson-Hatfield contribution is the point of increased hardness resulting from beryllium additions to plain carbon and alloy steels of certain types when the beryllium content ranges from about 0.50 to 1.00 per cent. In some cases, depending on the heat treatment, hardness is increased 200 to 300 per cent. An 0.25 to 0.29 per cent

carbon steel containing about 0.50 per cent beryllium, water quenched from 900 deg. C., had a Brinell hardness of 387. The same steel without beryllium, treated in the same manner, had a hardness of only 131. A 0.17 to 0.21 per cent carbon steel with about 17.50 per cent chromium and 1.00 per cent beryllium had a Brinell hardness of 303, air-cooled at 950 deg. C., while the same steel without beryllium possessed a hardness of 203. Many similar instances of hardness increases abound in the paper.

Those familiar with the behavior of the beryllium-copper alloys after heat treatment will recognize a strong similarity with the beryllium steel results—marked increase in hardness but in many cases a decrease in ductility and toughness. Is it not likely that precipitation hardening takes place in the beryllium steel similar to the beryllium-copper alloys?

It is not unlikely that advantage may be taken of the hardening effect of beryllium on steel when some of the metallurgical and manufacturing problems are overcome.

Ship Castings of Alloy Steel

FOR the most part alloy steel castings have been largely confined to the field of small castings; at least in



the earlier days this was true. Gradually, however, they have been introduced into the field of large castings, such as rolls for rolling mills. Now alloy steel castings have found favor in large units for ships.

A year or so ago when several large stern posts for the new Navy cruisers failed in service, two of the original order which met all tests in service and otherwise were made of an alloy steel composition. It is understood that in the replacement of the failed cast steel stern posts alloy cast steel was also stipulated—a chromium-nickel composition. This enabled an otherwise lighter casting with no sacrifice in strength.

There has been some talk of adopting in the future the welded built-up construction of castings and rolled steel members for the stern posts needs for the new program of the Navy now under way. Though the alloy cast steel stern posts have given good satisfaction, there is a strong probability that the welded combination will be resorted to.

There is no reason why as good an alloy cast steel stern post or stem for the large or small cruiser cannot be made as was formerly done on a large scale when only plain carbon steel was used. The writer remembers well the many problems involved in molding, pouring, cleaning and heat-treating these large and complicated products. Much time is required but no casting was lost in manufacture or failed in service and there are many of them still in use in both Navy and merchant ships. Of course, it is claimed that adoption of the welded built-up unit will save time and perhaps weight.

• • •

Alloy Steels in Railroad Equipment

A NEW outlet for alloy steels is envisioned in a recent announcement of the Pullman Co., and it will mean much to the alloy steel producers if its possible ramifications are realized. This company, it appears, has built a car of chrome-molybdenum tubing with a shell of aluminum alloy to carry 50 passengers at a speed of 90 miles an hour. The weight of the car has been reduced to 25,000 lb. from 160,000 lb. for the standard coach. Streamlining has been introduced to reduce wind resistance 50 per cent.

Undoubtedly the development is a step in a movement which in time is sure to gain headway and revolutionize railroad equipment in general. In this form or in some modifications of it, already tried out, railroads are certain radically to change their equipment. And the change is bound to result in a greatly increased use of alloy steels, such as the chrome-molybdenum tubing, already a standard material in airplanes, not to for-

get stainless steels already incorporated in another type of coach or train.

Chromium in Malleable Iron

IN these columns in the issue of Aug. 24, emphasis was put on the "explosion" of an old theory that chromium is a poison in malleable iron. The comments were not meant to carry the impression that chromium in pig iron for malleable castings production was no longer a menace. The product described in the A. F. A. paper by Miss Hall is a new one, made possible by the addition of definite quantities of chromium whose possible harmful effect is controlled by the simultaneous addition of definite proportional amounts of silicon.

In other words, an alloy malleable iron containing chromium and silicon as alloying elements has been discovered that has unusual properties and is being commercially produced. If certain amounts of chromium in malleable pig iron are harmful and to be avoided in the iron used for straight malleable iron—and there are those who contend that this is not a tenable proposition—then this theory is not "exploded." It is a fact, however, that chromium can exist in special malleable iron products in conjunction with silicon.

Rustless Steel for the Navy

A NEW use for rustless steel has been developed for the U. S. Navy. Reports are to the effect that one large manufacturer of welded rustless steel structural members is building masts of this material for the Navy cruisers and other units requiring such structures. The main reason for using rustless steel for this purpose is the aim of the Navy to reduce, as far as possible, the weight of the completed unit without sacrifice of strength. Anti-corrosion is another factor influencing the adoption of rustless steel masts.

Another use for rustless steel by the Navy is its incorporation in various other parts of the superstructure of its ship where the combating of corrosion is a prime consideration. The large funnels and deck houses are to be made of rustless steel. In fact, plans for the use of this material are so comprehensive that a very large tonnage is said to be called for in future orders.

Use of Nitrided Steel Broadening

SUBSTANTIAL progress is being made in the use of nitrided steel. One of the chief applications is in valves where its resistance to wear has proved of distinct advantage in prolonging life and efficiency. As

shafts in pumps for automobile and truck engines, this material has proved to have marked advantages and has been adopted by several leading manufacturers. Two large producers of high pressure pumps are incorporating nitrided steel shafts and other parts in their products. For ways and for spindles in machine tools nitrided steel has found much favor and it is said that, when this industry again experiences larger demand, there will be greater use of nitrided steel. Two large steel companies, specializing in high quality steels, are reported to be furnishing the bulk of nitralloy for nitrided parts.

Aluminum from Low-Grade Clays

REPORTS have appeared in this country to the effect that Russia is conducting researches toward solving the problem of producing aluminum from low grade clays. The actual facts from a reliable source are to the effect that the Russians have few deposits of good bauxite and are consequently reported to have been spending time and money in the extraction of aluminum from clay. This is also true of Germany. It is technically feasible to extract aluminum from clay and, in case of war, such a process might be of distinct value if the supplies of bauxite were cut off. None of the processes, however, so far described in the literature, or the processes which have been described as being the ones investigated by the Russians, would have any possibility of competing in cost with the current commercial processes for extracting alumina from bauxite.

An Improved Zinc Coating for Steel

A PROCESS for improving the zinc coating on iron and steel products has been announced under the name "Duo-zinc." It is claimed that this new method gives steel products enhanced quality and sales value because the zinc coatings produced are especially durable, unusually fine-grained and a pleasing white in appearance.

The new process uses an improved zinc cyanide plating method which is characterized by the use of anodes containing a small amount of mer-

cury. The presence of the mercury is claimed to eliminate local action and excessive solution of zinc from the anodes, to balance anode and cathode efficiencies, to stabilize the bath, to prevent fouling of the baths and the production of a rough plate by the absence of all anode slimes and to form a coating more resistant to staining than ordinary zinc plates.

Valves and Fittings of Rustless Steel

IN this connection the fact may be mentioned that the Navy is now adopting, on a large scale, the use of valves and fittings made of rustless steel castings, where both corrosion and high temperature conditions must be met. It is stated that foundry technique has progressed to the point where these parts are now being successfully made by at least two steel foundries in this country, meeting requirements as to appearance, serviceability and weight. Prospects are that there will be a very large demand for these rustless steel products.

Chromium Plating in Refrigerators

WIDE use of chromium plating is now standard in several types of electric refrigerators. The trim for the doors, such as hinges, door openers, and so on, are now made of a metal which has the buff colored chromium-plated finish and is non-tarnishable as well as attractive. In many refrigerators the shelves are tin-coated skeleton material.

Navy Propellers of a New Alloy

ONE of the castings made not long ago of the new beryllium-copper alloys was a small propeller for a racing boat. It was possible to make the propeller considerably lighter and thinner without loss of strength.

Partly as a result of this experience, the United States Navy has become particularly interested, on the score that the alloy may be utilized for some large propellers. The aim, of course, of the Navy is to save weight wherever possible without sacrifice of strength and efficiency. If propellers can be made of this new alloy (about 2.5 per cent Be), considerable saving in weight should result. In the case of the small racing boat propeller, a decrease in thickness of about 25 per cent from the propeller it displaced was found feasible and the gain in speed is stated to have been about 2 sec. per ½ mile over any propeller previously used. Special heat treatment of such propellers is necessary to overcome distortion, and this is a difficult problem.



Chromium in Malleable Iron

By HERBERT R. SIMONDS

IN an effort to develop a wear resistant malleable iron, Miss Rebecca Hall experimented with the effect of chromium additions in malleable iron. Her tests covered chromium from 0.25 to 1.15 per cent with the silicon controlled and varying from 1.02 to 2.02 per cent. In a report before the last convention of the American Foundrymen's Association, Miss Hall stated that the maximum tensile strength was secured when the chromium content was 0.84 and the silicon 1.57. Some producers of alloying elements apparently were much encouraged by Miss Hall's report, as they saw in it a possibility of an increased use not only of chromium but of other similar additions. Perhaps taking the wish for the deed, they have exaggerated the importance of the new chromium malleable product reported by Miss Hall. Statements recently have been made on both sides of the question as to whether chromium is potentially a good alloying element for malleable iron. The predominance of opinion seems to be against its practical use, and the following comment from Dr. Enrique Touceda, consulting engineer, Malleable Iron Research Institute, Cleveland, gives most of the essential features in the discussion.

"From Miss Hall's paper it was clear that no claim was made that the fracture of the chrome malleable castings was normal, that ductility was anything but moderate, or that machinability would equal that degree expected of regular malleable iron. To try and make this whole subject a little clearer, I would like to point out that in the early days the chief cause of the failure of malleable iron castings in service resulted from the fact that the castings were graphitized, consequently they were not much superior to gray iron. It was only when the plants became convinced that the composition of the mixture had to be so proportioned that primary graphite would be absent in even the thinnest sections that failures of this character were eliminated. Any attempt, therefore, to offset the injurious effect of chromium by silicon, even if otherwise efficacious, would certainly be doomed to failure as far as regular malleable iron practice is concerned, because the danger from graphitization increases with the increase in silicon.

"Just the amount of chromium that safely can be present in a malleable iron product, without danger of its being rejected due to abnormal fracture, unfortunately cannot be definitely stated. Some plants claim to be able to run without trouble on a chromium content as high as 0.035 per cent. Others have found with this percentage that on occasion they do receive complaints that their castings do not machine with sufficient ease and that the fractures are somewhat steely. In such cases a metallographic examination has shown that while the fracture was abnormal, the structure was normal in all particulars. In such instances, therefore, little doubt remains but that the trouble had been caused by chromium.

"Some foundries even state that they have experienced no difficulty when the chromium content in the casting was as high as 0.06 per cent, but by far the majority never come anywhere near this high a percentage. In my own experience I have never found a casting containing as much as 0.06 per cent chromium that was not deficient in ductility, hard to machine and of abnormal fracture. The result of a long series of tests

A RECENT statement suggesting that chromium might not be as bad an ingredient in malleable iron as hitherto supposed, caused quite a furor in malleable iron circles, and part of the discussion which reached The Iron Age forum department is included in the accompanying article.

Following a previously announced policy, the questions and answers received in the forum department will be grouped wherever possible and answered in the form of brief articles, of which this is the second.

through ladle additions of ferrochromium indicates that the danger point as to abnormality of fracture is in the vicinity of 0.035 per cent chromium.

"No investigator with whom I am familiar has thus far found an agent to successfully neutralize the evil effects of chromium in malleable iron. It is true some elements do offset certain of the disadvantages of chromium, but they all introduce other troubles."

Subject Still Unsettled

The comment of Dr. Touceda is based on practical experience with malleable foundries and it should not be considered as irrevocably barring the use of chromium in malleable iron. The whole subject is still in a somewhat unsettled stage. Some foundries very definitely are using 0.04 per cent chromium without disastrous effect and many research engineers feel that there is a possibility of developing a malleable alloying technique which may include fairly high percentages of chromium. Some of the comments received in support of chromium indicate that its bad reputation among malleable foundrymen is at least partially unwarranted. Chromium will cause trouble if other conditions are not carefully watched, and perhaps the most practical way for the foundryman to meet this situation is to follow Dr. Touceda's suggestion and limit the chromium in his pig iron to around 0.035 per cent when no steel scrap is to be used in the mixture. If steel scrap is to be used, the chromium in the pig iron, of course, should be still lower as a safeguard against possible chromium in the scrap.

One of the difficulties in discussing problems in the malleable iron field comes through the lack of a standard definition of malleable iron. Thus a group of alloy irons produced in malleable foundries by a so-called shock anneal method has characteristics similar to steel. Other products of the malleable foundry are closer to cast iron. The whole malleable industry is expanding to include a constantly increasing line of alloy irons and a changed technique of anneal resulting in castings which differ in composition, in structure, in tensile properties, and in machinability from the product generally recognized under the definition of malleable iron.

Develops Pedestal-Type Comparator and Measuring Machine

FOR toolroom, production or laboratory inspection, the Jones & Lamson Machine Co., Springfield, Vt., has developed the pedestal-type comparator and measuring machine here illustrated. The machine can be furnished either with or without measuring attachments, for comparing objects or for making vertical, lateral and angular measurements respectively. It is rigid and self-contained, and all operating mechanism is within easy reach of the operator when he is sitting before the 14-in. diameter chart.

The machine has a substantial base with two large bearings for supporting and guiding the 3½-in. diameter ram on which the table is mounted. The upper portion of the ram is threaded and is incased in a 12-in. diameter ball thrust handwheel for vertical adjustment. Maximum vertical table travel is 6 in.

The hood on top of the column incases the mirror and supports the screen and projection lens. The lamp house, carrying a 50 candlepower Mazda lamp, is supported on a pedestal mounted on a bracket that pivots directly under the lens system. By swinging the bracket and adjusting the lamp house the light beam can be thrown parallel to the helix of a screw thread or hob tooth. The light from the lamp passes through a pair of con-

densing lenses, across the object, and through the projection lens to the mirror from which the shadow is reflected back to the translucent screen.

Three styles of table can be furnished. One of these, a plain table, is without lateral adjustment; the other two have lateral adjustments of 4 in. and 10 in. respectively for measuring 4 in. and 10 in. of spacing or lead. The table with 4-in. lateral adjustment is mounted on balls and held against the end of a lead-screw by means of a weight. It can be roughly adjusted with the lead-screw or moved independently of the screw, to insert end-measuring bars between the micrometer anvil and the adjustable anvil on the front of the table. The standard end-measuring bars measure even inches and fractional

dimensions are measured with the micrometer. All styles of table can be swiveled 15 deg. each side of center. Centers with standard center blocks will stage objects up to 5 in. diameter.

An attachment can be furnished for measuring vertically up to two inches.

For measuring angles a vernier attachment is supplied. This, working in conjunction with the graduated 16½-in. diameter ring, permits accurate measurement in degrees and minutes. A standard 8 x 10 in. photographic attachment that permits taking photographs under ordinary shop lighting conditions can be furnished. Provision is made for inspecting by reflection such objects as type faces or contours having surfaces that cannot be projected. All machines can be equipped with a universal stage for mounting production screws to measure form, lead and pitch diameter. Five lens systems, from a 25 mm. system that will project 5/64 in. areas at 200× to an 82 mm. system that will project ¾-in. areas at 12 magnifications can be supplied.

Automatic Drilling Machine for Structural Fabricating Shops

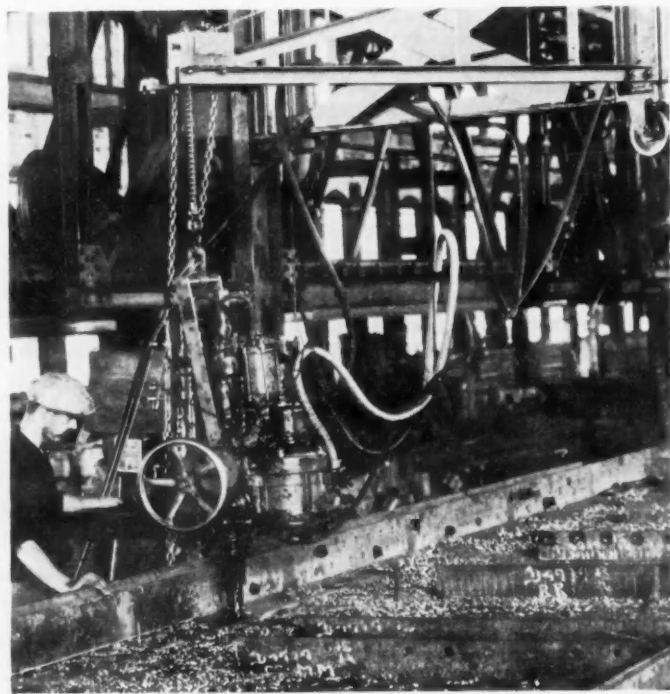
COMPACTNESS, ease of handling, and an entirely automatic drilling cycle are features of the high-speed drill press illustrated, designed for use in structural steel fabricating shops.

This machine, brought out by the Artos Engineering Co., Milwaukee, consists of a drill head suspended from a swinging and adjustable horizontal support which is made up of



The optical projection machine (at left) can be furnished either with or without attachments for comparing objects or for making vertical, lateral and angular measurements.

Completely automatic drilling cycle and automatic work clamping and unclamping are features of the structural shop drill shown below.



structural steel and mounted in ball bearings. The support is mounted on a runway along the wall or on columns, similar to a crane runway. The drill head is counter-balanced to permit the operator to move the head and quickly locate the drill point in the center-punch mark with minimum effort.

The drill head is mounted in a cradle to facilitate handling when changing from a vertical to a horizontal drilling position and vice versa. It is arranged so that the head is automatically clamped to the material to be drilled before the tool penetrates into the work. This, it is pointed out, permits drilling of curved structures and, regardless of the location of the hole, the drill will always penetrate perpendicularly relative to the drilling surface. The clamp is quickly adjustable for various thicknesses of mate-

rial. The automatic clamping is of advantage in drilling laminated structures "from the solid." As shown, the drill head, consisting of motor, air cylinder, gears, valve control and other parts, is a compact unit.

In drilling, the operator simply moves the drill head over the punch mark, locates the drill point by means of a hand-wheel, and then presses a button. The drill head then clamps to the structure automatically and drilling starts; after the hole is drilled the tool withdraws automatically and the clamp releases. In drilling an assembled section 3-in. deep, using a 15/16-in. drill, the cycle of operations is performed in 1 min. 2 sec., 52 sec. of which is consumed by the drilling. It is stated that one operator can handle two drills, and when the machines are not in use they can be pushed back against the wall.

Hydraulically-Controlled Internal Grinder for Long and Large Bores

THE Bryant Chucking Grinder Co., Springfield, Vt., has brought out a new heavy-duty internal grinder for high production grinding of long and large bores. Unusual mass and rigidity are said to result in a high finish that eliminates the necessity of honing or polishing, as well as in high production. Two sizes, having a swing of 21 in. and 31 in. respectively, are available. The width of gap from the work spindle nose is 16 in., the maximum stroke is 18 in. and the grinding stroke is 14 in. The net weight of this grinder, the No. 24, ranges from 13,000 to 13,500 lb.

The machine is fully hydraulic, the diamond holder, cross-feed and wheel-slide lifter, as well as traversing of the wheel-slide, being operated hydraulically. These various units are interlocked so that the operator has complete control over all motions by

means of one simple lever. Work spindle automatic starting and stopping is tied in with the motion of the wheel-slide, so that when the wheel-slide is withdrawn from the grinding position the work stops rotating, and when it is advanced toward the grinding position the work starts rotating.

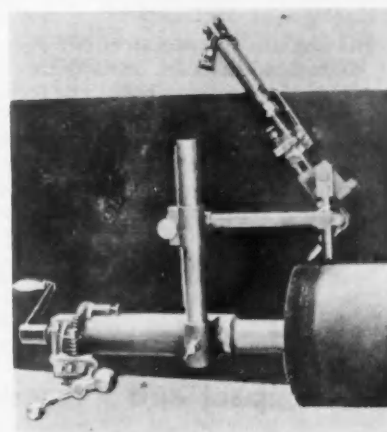
Of box-type, the bed casting weighs 6000 lb. The wheel-slide bar, formerly a semi-steel casting, is made of steel, carburized and hardened. A heavier work spindle with improved ball-bearing mounting permits use of a heavier chuck without danger of spindle deflection. It is driven by Texrope from a multi-speed motor. The wheel-spindle drive has also been improved.

The hydraulic valve block and control is located at the right hand end of the machine to facilitate operation. The valve mechanism has a shock absorber arrangement to assure

smooth reversal of the wheel-slide even at the highest speed. Pressure lubrication of the slide bar bearings also makes for smooth traverse of the wheel-slide. The motor-driven coolant pump is now mounted on an auxiliary coolant tank separate from the bed of the machine. Although this increases floor space occupied, it provides greater coolant capacity and simplifies cleaning and changing of coolant. A coolant filter is used on work for highest grade of finish.

New Oxy-Acetylene Pipe-Cutting Machine

A PIPE-CUTTING and beveling machine has been added to the Oxweld line of apparatus made by the Linde Air Products Co., 30 East Forty-second Street, New York. It consists of a center rod with three spreading arms which press against the inner wall of the pipe, holding it in position, with an arm supporting a blowpipe that can be adjusted to the desired angle of the cut. The blowpipe and arm rotate without the use of a crank for quick centering of the device, and

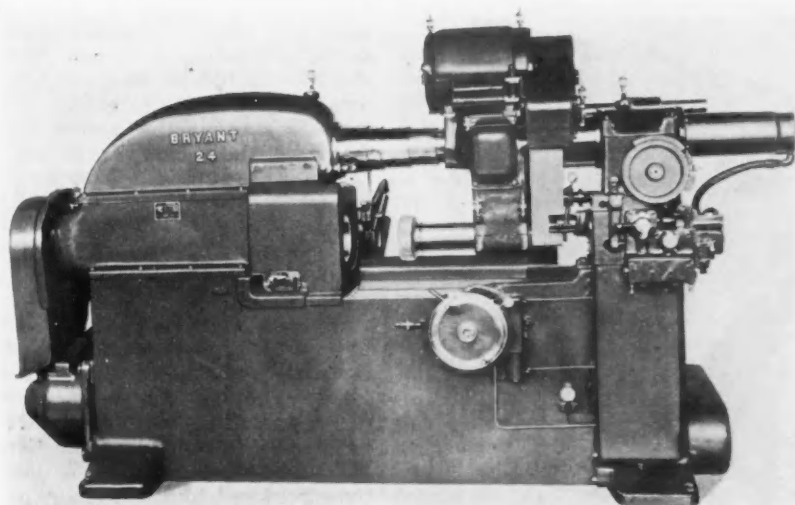


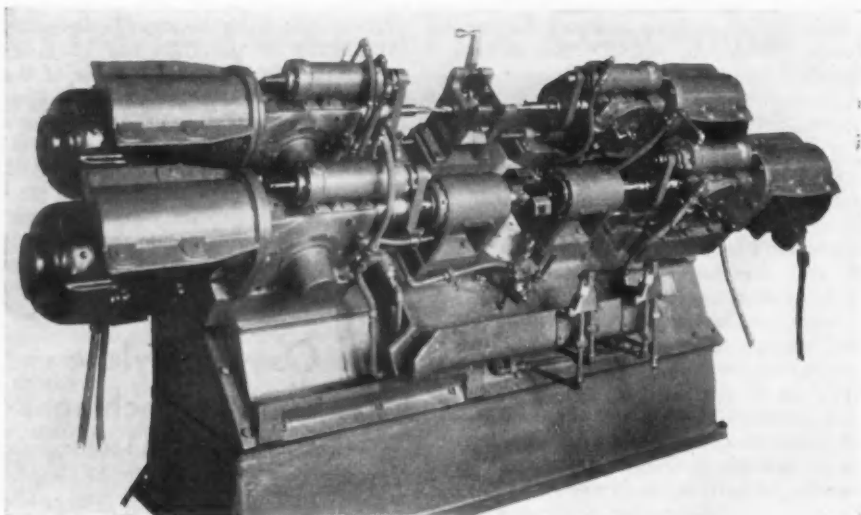
by means of a crank when doing actual cutting.

This machine will take almost any hand-cutting blowpipe, is readily portable, and is simple to operate. Once centered in the pipe, the operator merely turns the crank causing the blowpipe to rotate evenly around the pipe, making a clean machine-like cut.

Production of Babbitt Metal Declines

WASHINGTON, Nov. 28—Production of Babbitt metal declined to 2,090,634 lb. in October from 2,419,194 lb. in September, according to reports received by the Bureau of the Census from 39 manufacturers. Sales dropped to 1,554,931 lb. from 1,803,709 lb. In the first 10 months of the current year, however, production rose to 19,389,865 lb. from 14,575,355 lb. in the same period last year. Sales increased to 15,226,987 lb. from 10,644,515 lb.





Piston Boring, Centering and Drilling Machine

THE open end of pistons is accurately bored and faced, the closed end is centered and the pin hole is rough cross drilled by the two-way double-bank piston machine illustrated which was built recently by the Millholland Sales & Machine Co., Indianapolis.

The machine is made up of two pairs of Millholland machine units mounted opposed on an inclined bed. The front pair of these machine units are equipped with accurately mounted ball-bearing boring heads. One boring head is for boring the open end and facing the piston and the other end carries a centering drill for centering the closed end, the work being

gripped by a two-jaw air chuck. The rear pair of machine units are arranged for rough drilling the pin hole after the piston has been bored and centered on the lower pair.

As operation of the lower bank of machine units is controlled by one lever and operating the upper bank by another lever, the operator can load from the lower bank into the upper or can run each bank independently if required. It is stated that 300 to 400 pistons are bored, centered, and cross drilled per hour. The same type of double-bank machine can be used for duplicate operations and a variety of different operations.

Compact and Accessible Diesel Locomotives

TWO 35-ton Diesel electric locomotives shipped recently by the Atlas Car & Mfg. Co., Cleveland, to the Naval Ammunition Depot at Oahu, Hawaii, are shown in the illustration. They have 38-in. diameter steel-tired

wheels, with two 140-hp. electric motors, one to each driving axle. The engine is a Westinghouse four-cylinder, solid injection Diesel with a brake horsepower of 265. It is direct connected to a generator that fur-



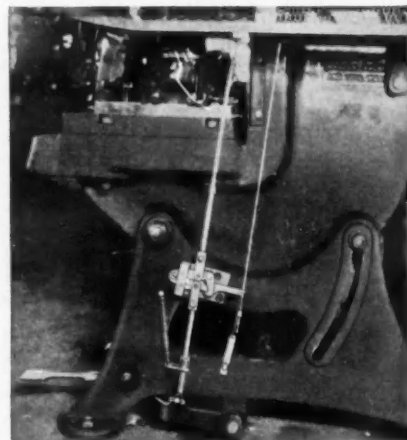
32—The Iron Age, November 30, 1933

nishes the electricity for the main propulsion motors.

These locomotives have a rating of 7.5 hp. per ton. As they were for narrow-gage operation, 36-in., they had to be made compact to meet the width, length and height limitations set by the Navy. This necessitated careful designing to permit arranging the apparatus within the space allowed and also to permit easy access. Locomotives of this type are suitable for interplant haulage and may be built to meet individual conditions.

Punch Press Non-Repeat Device

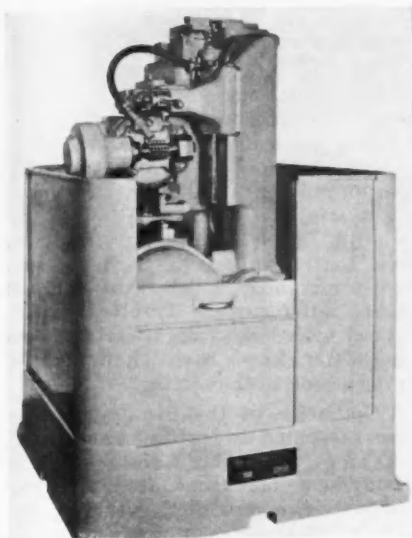
TO meet requirements of State laws for a positive acting non-repeat device for punch presses of all sizes, the American AllSafe Co., Buffalo, N. Y., is offering the device here pictured. This non-repeater is actuated positively by the rotation of the press. In operation, it separates the clutch rod, thus making a repeat impossible. The device is adapted for all types of installations with either left-hand or



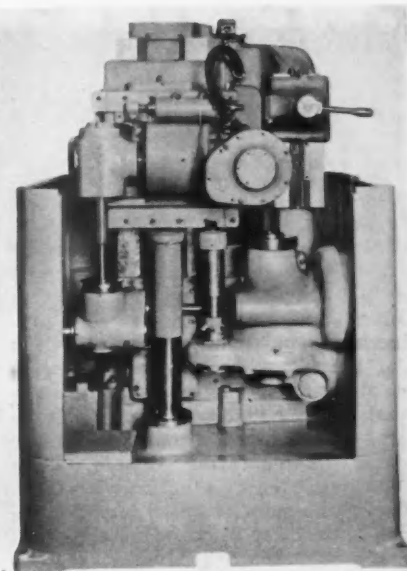
Non-repeat device with cover removed. The clutch rod can be straight or at an angle.

right-hand clutch rod. It can be used with any type of point-of-operation device or two-handed device. It may also be installed where the clutch rod does not pull in a straight line. The device is quick acting and it is said that time studies show that its use does not retard production. Working parts are made of case-hardened steel and bronze to assure continuous performance without repairs.

Unfilled orders for railroad locomotives, as of Oct. 31, 1933, totaled 83, the same as at the end of September. On Oct. 31, 1932, 146 locomotives were on order. These data, which are reported to the Bureau of the Census, Washington, do not include locomotives produced by railroad companies in their own shops.



Automatic Hobbing Machine of Compact Design



A NEW automatic hobbing machine of compact, sturdy design, requiring but 16 sq. ft. of floor space, has been announced by the Lees-Bradner Co., Cleveland. This machine will cut gears up to 7-in. outside diameter, 9-in. face, pitches up to 4 diametral pitch in steel. It will cut straight or taper serrations, spline shafts, spur gears, worm wheels, helical gears—right or left hand—angles up to 45 deg.

The operator merely places the work in the machine and presses a button; the cutter feeds in automatically at an accelerated speed to the full depth of cut against a positive depth stop, then feeds across the face of the work automatically at a constant speed. At the completion of the cut, it automatically backs out of cut rapidly to clear work on return stroke. The return to initial position shuts off both the motor and the flow of the coolant, bringing the machine to a complete stop ready for removal of work and insertion of new piece. A complete cycle has been accomplished and the operator has only to place work in position and remove finished piece when machine comes to a stop.

Bearings throughout are of anti-friction type. Lubrication is automatic; a centrifugal pump delivers oil from the base, through a filter, to a distributor manifold at the top of the machine, whence it flows by gravity through all bearings, over all shafts, gears and moving parts, and returns to a reservoir in the base.

The tailstock is secured to the square ways of the column by means of taper gibs and clamps, and is actuated and clamped by a double movement of a single lever. All ways are of square type and of ample proportions—double gibbed with take-up to provide for wear—assuring perfect alignment and continued accuracy of work.

A micrometer depth stop is provided by means of which depth of cut can

be changed readily and against which the cutter head is rigidly held throughout entire cutting period. Chips are caught in the base where they can be easily removed by raising panel at rear of machine. The splash guards are unique and so designed that coolant is kept within the machine at all times.

Power is supplied by individual motor through Texrope drive—fully inclosed. A 3 h.p. constant-speed ball-bearing motor, fully inclosed, and fan-cooled, is recommended.

Conveniently Arranged Tool and Cutter Grinder

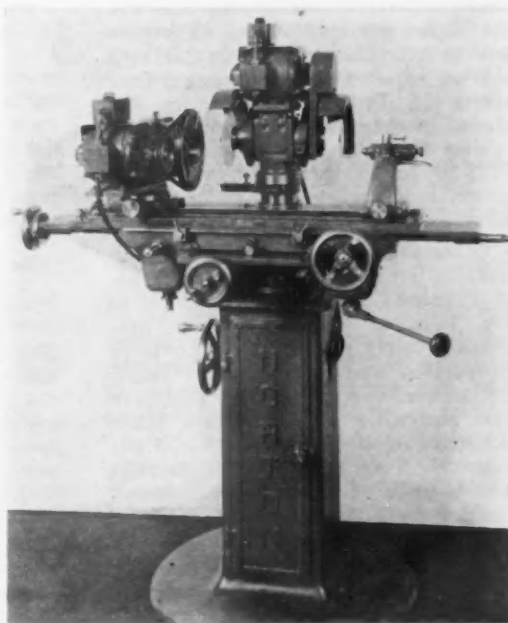
ADDITIONAL new machines to be exhibited by the Norton Co., Worcester, Mass., at its plant during the week of Dec. 4 include the new No. 1 tool and cutter grinder illustrated. The wheel-drive motor is mounted directly on the wheel-head and drives the spindle by V-belts. The wheel spindle is of cartridge type, plain bronze, ball or double-taper type bearings being available. The wheel-head is graduated horizontally and swivels through 360 deg.

Convenient arrangement is a feature of this tool. The base casting is of such size that the operator can straddle it conveniently while grinding. In addition, a duplex feature permits operation from either front or back, since the various hand-wheels can be mounted at either or both ends and either in front or back, or both. The machine is supplied with one set of hand-wheels and levers that can be transferred to corre-

sponding positions on the opposite side. Additional hand-wheels and levers can be supplied. The wheel-head elevating mechanism operates in anti-friction bearings.

A universal work-head that can be clamped to the table can be supplied. It is graduated, and will swivel 360 deg. horizontally and 200 deg. vertically. The spindle runs in anti-friction bearings. The head mounts either a three-jaw or face chuck, and provision is made for quickly attaching a driving motor when it is used as a headstock. A separate set of graduations is provided for use when setting clearance angles. A left-hand footstock can be supplied instead of the universal workhead, and attachments for internal and surface grinding are available.

The machine swings 10 in. over the table and with the universal work-head takes 17 in. between centers. Work centers are 47 in. above floor.



Metals in High-Temperature Service at Detroit

A REPORT of the experience gained from the operation of equipment using steam as high as 1100 deg. F. will be made by P. W. Thompson, chief engineer of power plants, and R. M. Van Duzer, Jr., engineer of the production department, Detroit Edison Co., Detroit, to the American Society of Mechanical Engineers at the annual meeting in New York. They believe that the design and construction of steam-generating plants using 1000 deg. steam is entirely feasible. Their statement is based on information gained from two installations: one, a superheater located at Trenton Channel which has been in operation 23,000 hr., 21,169 of which were at 1000 to 1100 F.; and the other, a superheater and turbo-generator located at Delray Power House 3 which has been in service 11,231 hr., 7832 of which were at 1000 F. The Trenton Channel equipment, consisting of a small separately fired superheater and piping system designed to handle 6000 lb. of steam per hour at 400 lb. per sq. in., was placed in operation in 1929 to provide design information for the 10,000-kw. turbo-generator, piping system, and superheater later placed in service at Delray Power House No. 3 with 400 lb., 1000 F. steam.

Good Showing of 18 and 8 Steels

The austenitic 18 per cent chromium, 8 per cent nickel alloy was used for the construction of the Trenton Channel apparatus, with the exception of chrome-tungsten-vanadium flange bolts and low-carbon tubes used in the cooler portion of the superheater. Likewise, the 18-8 material was selected for the piping and for the hotter portions of Delray superheater, notwithstanding reports from abroad of serious failures received after the Trenton installation was placed in operation. Examination of tubing from Trenton Channel after 6408 hr. of service had shown no appreciable change in properties of the alloy.

Other materials used in the Delray installation and later as replacements at Trenton Channel included steels in the so-called low-alloy group, possessing fairly good high-temperature properties, and having better fabricating qualities and a lower cost than the austenitic alloys. These steels consisted of 4 to 6 per cent Cr, 1 per cent W, from which three castings and a piece of tubing were made; a casting from $\frac{1}{2}$ per cent Mo; a valve body from 0.85 per cent Mo; and low, medium, and high C calorized steel. The high-temperature parts of the turbine were made from a 0.30

C, 3.1 Ni, 0.35 Cr, 0.35 Mo alloy, while the turbine nozzle sections were made from a 0.25 C, 14.0 Cr stainless steel, excepting the first wheel blading, which was a 0.47 C, 11.8 Cr, 36.3 Ni steel.

Results of examinations made on various materials from both installations show that some changes have taken place. Loss of strength or tendency toward embrittlement has not progressed to such an extent that consideration has been given to the replacement of any parts. Tests of three different pieces of 18-8 tubing, the last of which was in service for 21,496 hr., 15,159 of which were at 1100 F., exhibited a tendency toward embrittlement, but still possessed excellent physical properties. Examination of three Rezialt castings, one of which cracked in service, showed these parts all in poor condition because of inclusions and blowholes originally present. The result of tests on a 4 to 6 per cent Cr, 1 per cent W valve body, after 12,995 hr. of service, showed no embrittlement. An investigation conducted on the Ni-Cr-Mo turbine material likewise disclosed no tendency toward embrittlement. The Cr-W-V bolting material used in most of the bolted joints is not entirely stable. Its use, however, has been continued, as less joint maintenance has been experienced than with other steels. Nitralloy seat rings removed from two different valves were badly scaled and softened, indicating that this alloy is unsuited for high-temperature valve trim. Experience to date with calorizing would indicate that this material does offer some degree of protection to the surface of carbon steels.

The original Trenton Channel pipe joints, all designed to the 600 lb. A. S. A. flange standard, have proved inadequate because of the high working stresses and stresses caused by thermal expansion. Later heavier designs have given little trouble. Welding, however, appears to offer the most possibilities for future pipe joint design.

Resistance to Creep Satisfactory

With the exception of the original pipe joints, excessive growth of calorized superheater tubes, and the turbine throttle valve, the creep resistance of all parts subject to high temperature has been satisfactory. Severe dishing of the throttle valve bonnet flanges had made it necessary to replace the original valve. Creep of certain of the superheater tubes and pipe fittings at Delray has been measured but at rates, in most cases, not exceeding the design rate of 1 per cent per 100,000 hr. Measure-

ments of turbine parts after service have not been taken, except in the case of the steam chest, where no change was observed.

Turbine troubles have been the leaky throttle bonnet joint, wear of all the shaft packing caused by rubbing during start-up periods, and binding of the throttle valve stem. This latter difficulty was caused by the growth of a semi-steel packing sleeve. This bushing, as well as similar ones in the five control valves, has been replaced with nitralloy, which thus far has been satisfactory. Troubles experienced with loose tube tiles in the superheater have been eliminated by alterations to the setting.

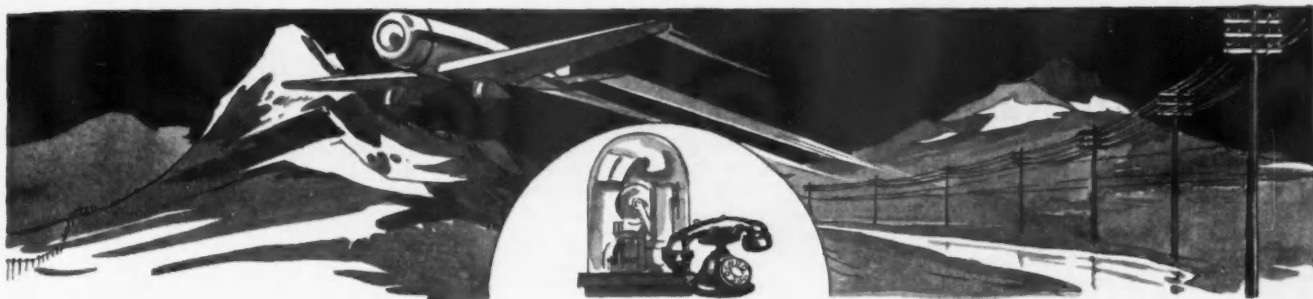
Operation of the two installations has presented no features particularly different from those encountered in equipment operating at lower temperatures, except in the starting procedure followed for the turbine in which 1000 F. steam is not used. The unit is started with 700 F. steam and 30 per cent load applied before the temperature is increased. The same procedure in the reverse order is followed in shutting down. High-temperature steam for starting has not been used because of the greater thermal stresses that would be set up.

Depth of Cold Work by Machining

DETERMINATION of the depth of cold working resulting from machining is the subject of a paper to be read before the American Society of Mechanical Engineers in New York on Dec. 7 by L. Thomassen and D. M. McCutcheon, of the University of Michigan, Ann Arbor, Mich. They define "depth of cold working as the distance below the surface where the effect of lattice deformation is no longer noticeable in the X-ray diffraction picture. This quantity can be determined as follows:

"After annealing, an X-ray picture is taken of the sample as a record of the structure. The machining operation is then carried out under as carefully controlled conditions as possible. The machined surface is etched to remove a definite thickness of material, and a new X-ray picture taken, which is compared with the first picture. If the two pictures are identical, the new surface produced by etching is below the depth of cold working. If the effect of work is still evident, the procedure is repeated in small steps until a picture is obtained which shows the same structure as the first picture. The total thickness of material removed by etching is then the depth of cold working."

Grinding off the surface for photographing, they add, instead of etching, is out of the question, since grinding produces complete fragmentation of the surface and also comparatively deep cold working.



THE NEWS OF THIS WEEK

British Demand for Pig Iron and Steel Is Well Sustained—Continent Active

LONDON, ENGLAND, Nov. 28 (By Cable).—Improvement continues, as home demand for pig iron expands. Middlesbrough furnaces are well sold into the first quarter, and some are declining further business.

Strong demand for semi-finished steel has enabled the reopening of more plants after three years' idleness.

ness, and output has increased at others.

Shipbuilders and railroads are placing more work, but general export is still quiet. Tin plate business is moderate, but inquiry is good. Home consumers feel that the moment is opportune to place orders, as British steel prices are stiffening. Most works are quoting 16s. 9d. f.o.b. works port, this year and 17s. for first quarter. But 16s. 6d. has lately been accepted for favorable specifications.

Continental steel is affected by dollar movements as strong renewal of United States competition is feared. Semifinished mills are well booked and higher prices are expected for United Kingdom business. Belgian works have booked 15,000 tons of rolled steel for Russia.

United Kingdom mills are strong buyers of wire rods at £7 5s., sterling, delivered.

Brussels reports that differences between Belgian Cartel and Clabecq are settled and renewal of Cartel is assured at end of year.

Swedish rolling mills are busy and output is increasing.

members of the association, were represented at the meeting: Ingersoll Steel & Disc Co., Chicago; Murray Corp., Detroit; Thermo Barrel Co. of America, Philadelphia; Pressed Steel Tank Co., Milwaukee; A. O. Smith Corp., Milwaukee; Buhl Stamping Co., Detroit; Solar-Sturges Co., Melrose Park, Ill.; Motor Wheel Corp., Detroit; National Enamelling & Stamping Co., Milwaukee, and Firestone Steel Products Co., Akron, Ohio.

All activities of the association are directed by Mr. Bittel, with offices at 1152 Hanna Building, Cleveland.

Union Beaten in Vote At Ingersoll Plant

ELECTION of workers' representatives at the plant of the Ingersoll Steel & Disc Co., New Castle, Ind., resulted in an impressive victory for the Mutual Benefit and Representation Association, which is sponsored by the company, over the Amalgamated Association of Iron, Steel and Tin Workers. The ballot was supervised by H. B. Dynes, representing the National Labor Board, and the final count stood at 295 votes for the Mutual Association, with only 70 for the Amalgamated.

The company had asked for an election in October to determine whether the men should be represented "through the outside union or the company union." Recently the local union of the Amalgamated joined in the request. The vote is particularly significant in view of the fact that the Amalgamated is seeking to unionize the steel rolling industry and has claimed considerable progress in the Chicago industrial district. Choice of representatives by the employees of the Weirton Steel Co., which experienced the first major strike in the industry several weeks ago, will be made between the Amalgamated and a company-sponsored employee representation plan when scheduled voting takes place next month.

British Prices, f.o.b. United Kingdom Ports

| Per Gross Ton | | | |
|---------------------------------------|----------|----|-------------|
| Ferromanganese, export | £9 | | |
| Billets, open-hrth. | £5 10s. | to | £5 12s. 6d. |
| Black sheets, Japanese specifications | £11 | | |
| Tin plate, per base box | 16s. 9d. | to | 17s. |
| Steel bars, open-hearth | £7 17½s. | to | £8 7½s. |
| Beams, open-hrth. | £7 7½s. | to | £7 17½s. |
| Channels, open-hearth | £7 12½s. | to | £8 2½s. |
| Angles, open-hearth | £7 7½s. | to | £7 17½s. |
| Black sheets, No. 24 gage | £9 5s. | | |
| Galvanized sheets, No. 24 gage | £11 5s. | to | £11 15s. |

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold \$ at \$4.86

| | |
|---------------------------------------|-------------|
| *Ingots | £2 5s. |
| *Billets, Thomas | £2 7s. |
| Wire rods, No. 5 B.W.G. | £4 10s. |
| Black sheets, No. 31 gage, Japanese | £11 5s. |
| *Steel bars, merchant | £3 2s. 6d. |
| *Sheet bars | £2 8s. |
| Plates, ¼ in. and up | £4 1s. 6d. |
| *Plates, 7/8 in. and 5 mm. | £4 3s. 6d. |
| *Sheets, 1/8 in. | £4 8s. 6d. |
| *Ship plates | £4 10s. |
| *Beams, Thomas | £2 19s. |
| *Angles (basis) | £3 2s. 6d. |
| Hoops and strip steel over 6-in. base | £3 17s. 6d. |
| Wire, plain, No. 8 | £5 7s. 6d. |
| Wire nails | £5 15s. |
| Wire, barbed, 4-pt. No. 10 B.W.G. | £8 15s. |

*Prices as established by European Raw Steel Cartel.

Steel Beer Barrel Makers Organized

THE Associated Manufacturers of Steel Beer Barrels held an organization meeting at the Borg-Warner Corp., Chicago, on Nov. 17, under the direction of Glenn W. Bittel as commissioner, which was attended by the principal manufacturers of steel beer barrels. A suggested plan of procedure was submitted by Mr. Bittel which was discussed and acted upon by the association. Active work will be started immediately to further the use of steel containers for draft beer.

The following ten member companies, which constitute the charter

Institute Authorizes Longer Deliveries On Sales to Railroads and PWA Projects

AS a measure of aid to the Government's recovery program, Commercial Resolutions Nos. 33 and 34 have been passed by the directors of the American Iron and Steel Institute, permitting members of the steel code to make sales of rails and track accessories and of products for use in public works and reemployment projects on contracts which call for delivery beyond a single quarter. Action on rail purchases was taken at the request of the Government, as Federal Coordinator Eastman had advised that in order to carry out the rail buying program, it would be necessary that contracts for rails and accessories provide for shipments up to July 1, 1934.

Under the steel code, in order to prevent speculative buying, its members must complete all shipments of products under contract before the end of the calendar quarter-year ending not more than four months after the date of the contract, the only exception being in the case of a product required by a purchaser to fill a contract with a third party at a fixed price. The institute's directors, extending a similar exception to include sales of rails and track accessories, have ruled that since such sales are largely to be financed by the Reconstruction Finance Corp., it is the same as if the United States had purchased the products directly and then resold them to the railroads.

With respect to products sold for public works or other reemployment projects, the resolution points out that the provision against deliveries beyond a single quarter was not meant to apply to products required for government projects or other definite capital investments. Accordingly, exceptions allowing longer delivery dates on contracts are made for any products required for any federal, state, county or municipal projects.

Bookkeeping Simplified

Commercial Resolutions 31 and 32, also approved by the institute directors on Nov. 15, are designed to clarify routine procedure under the code which had led to misunderstanding and excessive detail work. The former authorizes the members of the code to treat the date of mailing of a check or other order in payment of an invoice as the date of such payment, while No. 32 allows the waiving of interest charges on invoices which may have accrued under the provisions of the code, amounting to less than \$1 in any one month.

Arbitrary Charges Reaffirmed

Commercial Resolution No. 20, dealing with switching charges to be added to base prices for products de-

livered at basing points other than Gulf and Pacific Coast ports, has also been amended and in its revised form supersedes Resolution No. 7, which dealt with switching charges at Gulf and Pacific Coast ports. The amended resolution makes no change in the arbitrary switching charges of 60c. a ton in the delivery of carload lots of iron and steel products at Chicago, Evanston, Ill., and Gary, Ind., and of 50c. a ton for carload switching at all other basing points. For deliveries in less-than-carload lots at all basing points the charge is set at 10c. a 100 lb., but must not in any case exceed on any one shipment the charge per carload at the carload rate specified for the basing point in question.

Milwaukee Road Asks Bids on Machine Tools

THE Chicago, Milwaukee, St. Paul & Pacific is asking bids on the following machine tools: A 42-in. x 16-ft. lathe with 8-ft. centers; a 48-in. radial drill; a 32-in. shaper, a 54-in. double-head boring mill; a 16-in. x 8-ft. lathe with 4-ft. centers; a 20-in. x 9-ft. lathe with 4-ft. centers; a 24-in. x 12-ft. lathe with 6-ft. centers; two 3-in. x 18-in. double grinders, one 4-in. turret lathe; a 16-in. high-speed drill; a 12-in. x 15-in. hack saw; a 6-in. double bench grinder; an 8-in. double bench grinder, and a 10-in. double bench grinder.

Heating Investigation At Mellon Institute

THE Multiple Industrial Fellowship on heating, sustained in the Mellon Institute of Industrial Research, Pittsburgh, since 1929 by the National Radiator Corp., Johnstown, Pa., is continuing a number of investigations of interest to heating specialists as well as users of heating equipment. The Fellowship also has been lately according more and more research attention to certain problems in air conditioning and to the development of new products.

After a thorough investigation of ferrous and non-ferrous heating units, the fellowship has reached the conclusion that cast iron is the most suitable metal for the construction of finned convectors. Results of work on impregnated wood foundry patterns, now fully patented, are likewise of interest to heating industrialists. This development is of broad application in the foundry field.

During the past three years the fellowship has been engaged in the de-

velopment of corrosion-resistant materials especially for use in the petroleum and other process industries, conducting this investigation in collaboration with the research department of the National Radiator Corp. During the course of these studies the findings of the International Nickel Co. respecting the place and utility of "Ni-Resist" have been corroborated. The fellowship has also had a productive part in the design of National condensing sections, for which broad patent protection has been secured.

Soil Pipe Industry Asks Shorter Week

WASHINGTON, Nov. 28.—A public hearing upon a proposed modification of the code of the cast iron soil pipe industry will be held in the Department of Commerce Building on Dec. 4. This code became effective Sept. 11. Deputy Administrator H. O. King will conduct the hearing.

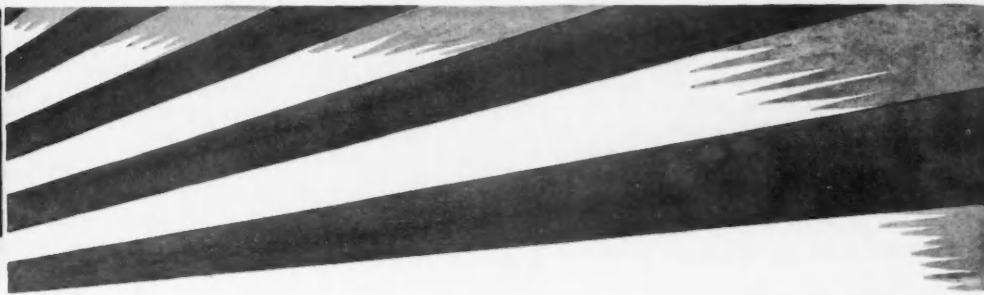
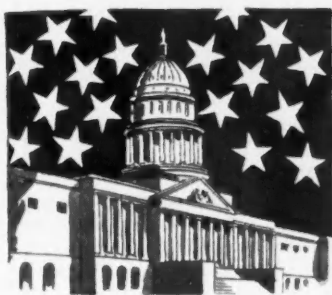
The proposed modification would provide that three days of nine hours each totaling 27 hours shall be the maximum days and hours of labor per week except as otherwise specified. It is also proposed that the industry shall not operate productive equipment for more than three days, not exceeding nine hours each or a maximum of 27 hours per week.

Machine Tool Orders Higher in October

A SHARP increase in demand for new production tools occurred in October according to the National Machine Tool Builders' Association. The index of new orders in October was 67.1, against 55.8 in September and 57.4 in August, according to the weighted averages of reports from 74 leading manufacturers. The volume of current business exceeded the best month of 1932, and is back to the level of December, 1931. The unfilled order index, as of Oct. 31, was 105.4 compared with 85.9 for Sept. 30.

The distribution of new business is said to be much better with many companies reporting a larger dollar business than in any preceding month during the year. Despite the bulge in new bookings, present activity is far under the average index of 169 for the eleven years prior to 1932. Full one-shift capacity for the industry is estimated at 261, October orders, therefore, represented an activity of only about 26 per cent of capacity.

Sheldon, Morse, Hutchins & Easton, marketing counselors, have changed from a partnership into a corporation. William H. Easton is president; L. W. Hutchins, vice-president; H. A. Morse, treasurer, and A. E. Welty, secretary.



THIS WEEK IN WASHINGTON

Labor Asks Share in Machine's Profits

Wage and Hour Provisions in Machinery and Allied Products Institute Codes Are Also Attacked

WASHINGTON, Nov. 28.—Encouraged by its unionization of "captive" coal mines in western Pennsylvania, organized labor is focusing attacks for higher wages and shorter hours on the capital goods industries. Tying in closely with this drive is a new economic philosophy of the American Federation of Labor that technological unemployment should be regulated by contributions from profits earned by machines. An obstacle to this philosophy is the fact that many machines are not earning profits and it is hardly to be assumed that labor wants to share in the losses.

For labor to insist upon profits that do not exist, for the machine to do the impossible, is a new deal without a shuffle. Organized labor has seen itself advance so much under the NRA that it is given to overshooting the mark. This is not to say that it has frequently found itself on perfectly solid ground in the way of demands for increased wages and shorter hours. The NRA has disclosed much in the way of miserable wages, long hours, and revolting working conditions. And some industries have sought to continue these conditions. These are in a small minority, however, and have not been traced to technological improvements, which, with some lags, developed increased production, lessened labor costs, and hours, and increased wages.

Proposal of Cigarmakers' Union

The idea of machines contributing from profits for displaced labor developed at the NRA-AAA hearing on the cigar manufacturing code and was enunciated by I. M. Ornburn, president of the Cigarmakers' International Union.

"It is our proposal," said Mr. Ornburn,

By L. W. MOFFETT

Washington Editor, The Iron Age

burn, "that if and as the machine displaces workers it must bear a share of the burden of that displacement by a contribution of cash per machine to help tide the displaced workers over until they can be placed in other occupations.

"We contend the time has passed when a machine can come along and throw workers into the discard without compunction and without relief. We shall press hard for adoption of our proposal. No one has proposed any other sound way of meeting the issue of what to do about the man who is displaced by a machine.

"If there is any good reason why, in accord with the basic principles of NRA, machinery should not be brought under the collective control of each industry for the purpose of protecting the industry and its employees alike, we have not heard of it. I predict our proposal will appear in code after code when our hearing is over."

Capital Goods Industries Attacked

This move in connection with the cigar manufacturing code had a direct bearing on attacks made by organized labor and representatives of consumers against the capital goods division of the NRA. It is charged that the division is unfair to labor in dealing with codes of some 40 capital goods industries. How serious it may be is difficult to say, but the threat of widespread strikes was made. The codes under fire are being sponsored by the Machinery and Allied Products Institute, and the at-

tacks were made in connection with hearings last week on codes for the diesel engine manufacturing industry and the conveyor and material preparation equipment manufacturing industry.

The code for the conveyor and material preparation equipment manufacturing industry was presented by George P. Torrance, who said it had the support of 90 per cent of the industry. Colonel Horner asked members of the NRA advisory staffs assigned to the hearing to refrain from comment on the part the MAPI had in the presentation of the code and stated that before another hearing on a code for an industry in the capital goods group takes place he hopes to decide upon uniform labor provisions for all codes in this group.

Defends MAPI Codes

"This industry," Colonel Horner said, "is representative of the machine and capital goods group in this country. I have considered it desirable from the standpoint of economy of time and money for the NRA and of time saving for the executives in this general industry, that insofar as is practicable we have a basic code for all these allied industries, provided we can develop a civil, practicable, workable code having slight modifications to cover individual industries in the capital goods group."

It was pointed out by Colonel Horner that the question had been raised as to the connection of the MAPI with the diesel engine and other codes. Formation of the MAPI, to his mind, was a "wise conception by the industry." He said it was formed by men who are "recognized as leaders" in the industry. He added that while he had not discussed the matter with

National Recovery Administrator Hugh S. Johnson, he "understood General Johnson was in entire sympathy" with such a grouping of industry for code purposes. Horner said that between 40 and 50 codes would follow in this group and that before the next hearing he expected to arrive at a decision, with the aid of NRA advisers, on a uniform wage scale and work-week for all capital goods industries.

Labor States Position

E. C. Davison, secretary of the International Association of Machinists, listed the demands of organized labor, made in connection with capital goods industries generally. He asked a 35-hr. week and a minimum wage for common labor of 50c. an hour. He said the code would permit work for an unlimited number of hours except that in one six weeks' period the employees could not work more than 48 hours a week, and he "assumed this was an error or misprint." Colonel Horner asked Legal Adviser Swift for an interpretation of the clause. Mr. Swift said it meant that a 40-hr. rule would be observed except in peak seasons when the industry might work 48 hours a week for six weeks. Colonel Horner said the provision would be clarified so that there would be no doubt about the establishment of a 40-hr. week except in the rush season. Although asking 50c. an hour, Mr. Davison said the minimum wage should not be less than 45c. an hour.

Colonel Horner inquired if he were quite certain that a 35-hr. week and 45c. an hour would not result in less employment in view of the fact that the industry must sell its products in order to stay in business. He also asked whether labor did not agree that capital goods industries were in a special class inasmuch as industrial conditions generally had to look up before a normal demand for the products of these industries would be resumed. Mr. Davison said that the primary aim of the NRA was to lift wages and reduce hours to spread employment, but that it had failed in its purpose by the margin of 10,000,000 people who are being fed out of the public treasury.

Green Also Makes Demands

At the hearing on the diesel engine code, President William Green, of the American Federation of Labor, protested against the 40-hr. week, 40c. minimum wage rate for unskilled employees, and other provisions affecting labor. Stating that the code will serve as a standard for "at least 40 other codes" being sponsored by the MAPI, Mr. Green declared consideration of its terms, therefore, presented a "grave responsibility" to the NRA as well as offering the diesel engine industry an opportunity to make a "significant contribution to the recovery program."

Giving a hint as to the American Federation of Labor's future stand in

connection with codes, Mr. Green asserted that "the work week must be shortened in all industries." In this particular case, he said, a 40-hr. week would create no reemployment whatsoever, as the industry has lately been working less than that on the average.

Deputy Horner inquired as to how Mr. Green would "take care of the increased cost of production incident to a shorter week." Mr. Green replied that it would have to be passed on to the consumer—"that's always been the rule."

Mr. Green also attacked clauses in the code calling for collective bargaining between employer and employee, declaring that President Roosevelt "does not want codes to carry anything amplifying, qualifying or interpreting" the collective bargaining guarantee in the Recovery Act. As

he and other labor representatives have done frequently in the past, Mr. Green also asked for labor representation on the code authority.

Sales Much Lower

W. C. Dickerman, Auburn, N. Y., chairman of the code committee, said employment in the industry had fallen 51 per cent since 1929 and that sales for the first three months of 1933 were only 19.3 per cent of the volume for the same quarter of 1929. He added, however, that there had been some improvement in business and that the industry had increased employment 17 per cent and average weekly earnings per employee 12.6 per cent in operating under the NRA. John W. O'Leary, Chicago, president of the MAPI, made a brief statement in support of the code.

Navy Postpones Bids On Cruiser Steel

WASHINGTON, Nov. 28.—The Navy Department has postponed until Dec. 1 the opening of bids for bars and shapes, and until Dec. 5 the opening of bids for high tensile plates for the cruisers Philadelphia and Brooklyn and the gunboat Charleston. The bids originally were to have been opened last Friday. The postponement is due to revisions made in specifications. The same reason has been given for postponing until today the opening of bids for 268 tons of stainless steel for destroyer shields. These latter bids were to have been opened last Tuesday.

Slum Clearance in New PWA Allotments

WASHINGTON, Nov. 28. — The first slum clearance project to be considered under the PWA allotment of \$100,000,000 will be in Detroit, where Public Works Administrator Ickes said \$3,000,000 to \$4,000,000 could be profitably expended. Large slum-clearance and low-cost housing projects will be undertaken soon in other cities, including New York, Philadelphia, Washington, Chicago, and Cleveland.

The Civil Works Administration has granted \$10,000,000 to the Department of Commerce, whose Aeronautical division will enter upon the largest airport construction in the history of aviation, according to Director of Aeronautics Eugene L. Vidal. Of this total about \$2,000,000 will go for materials. It is planned to establish 2000 air fields on municipally owned land.

Among recent PWA allotments are the following: \$1,000,000 for a water-

works system, Tacoma, Wash.; \$2,996,000, hospital buildings, Hudson county, N. J.; \$850,000, reservoir, Hamilton, O.; \$2,502,000, waterworks system, Houston, Tex.; \$1,490,000, school, Rochester, N. Y.; \$859,000, sewage plant, Perth Amboy, N. J.; \$800,000, high school, Butte, Mont.; \$230,000, Sheffield, Ala., and \$130,000, Tuscumbia, Ala., construction transmission lines from Muscle Shoals.

The Navy Department will purchase 130 new aircraft, to cost \$6,114,391, out of an allotment of \$7,500,000. Improvements to aircraft power plants will cost \$489,000.

Steel Barrel Output Higher in October

WASHINGTON, Nov. 28.—October production of steel barrels in 26 plants reporting to the Bureau of the Census totaled 798,981 units, as compared with 519,191 units in the preceding month and with 422,637 units in October, 1932. Unfilled orders, as of Oct. 31, were 492,072 barrels, as against 539,846 in the preceding month and 475,318 on Oct. 31, 1932.

Malleable Castings Orders Are Lower

WASHINGTON, Nov. 28.—Production of malleable castings in October was 24,381 net tons in 112 establishments reporting to the Bureau of the Census. In the preceding month output was 27,078 tons in the same plants, while October, 1932, production was only 12,274 tons. New orders last month amounted to 19,933 tons, as compared with 22,744 tons in September and 12,850 tons in October, 1932.

Union Wins Employee Representation Vote in Most of Steel Company Mines

WASHINGTON, Nov. 28.—The strength of the United Mine Workers in steel company coal mines in southwestern Pennsylvania was manifested at elections held last Wednesday and Thursday under the supervision of the National Labor Board. Robert F. Wagner, chairman of the board, announced that of 14,137 votes cast, 9,929 went to representatives of the United Mine Workers and 4,045 to the independent brotherhoods.

In the first day's balloting at 14 mines of 10 companies, 6,024 votes were cast for representatives of the United Mine Workers and only 309 for representatives of the independents, meaning that President John L. Lewis and other United Mine Workers' officials will be spokesmen for these mines in collective bargaining with the operating companies. The total vote at 15 mines on the second

day, principally those of the H. C. Frick Coke Co., was 3,905 for the representatives of the United Mine Workers and 3,736 for representatives of the independents. Taken by mines, 20 gave majorities to representatives of the United Mine Workers and nine to representatives of the independents. At two of the Frick mines the elections were very close.

Tabulation by Mines

The tentative tabulations announced by Senator Wagner is shown in the accompanying table.

Building Operations Show Sharp Decrease

OCTOBER building construction projects in the United States increased 0.8 per cent, but indicated expenditures for total building operations decreased 7.4 per cent as compared with September figures, according to the Bureau of Labor statistics. The number of new residential buildings decreased 4.8 per cent, and new non-residential buildings increased 4.1 per cent in number. The number of additions, alterations and repairs to existing buildings increased 0.3 per cent during October, while expenditures for these alterations increased 18.1 per cent.

Federal awards for construction projects of all kinds totaled over \$134,000,000 during October, and new Federal building contracts awarded totaled \$14,000,000. Expenditures for all types of structures financed from public funds increased in October as compared with September.

Construction Code Is Still Being Delayed

WASHINGTON, Nov. 28.—The much-debated construction code still finds organized labor and the Construction League of America at sharp odds, despite efforts of last week to iron out differences. A new hearing was held and while "progress" was reported, it is clear there are wide conflicts still present. One of the major points is the plan of organization of the construction industry. The League is insisting it be organized as an entity. Organized labor is urging organization by crafts and establishment of minimum rates for skilled as well as for unskilled labor. Ordinarily organized labor has stood out against the idea of minimum wages of any kind, and especially for skilled labor, on the

ground that the minimum wages become the maximum wages. Even the NRA has drawn the fire of the American Federation of Labor because of the alleged yielding by the former to the League's idea of a construction code.

On the other hand, the League likewise is said to be irritated over the reported action of the NRA. It claims to have revised the code and clothed organized labor with extreme powers in the way of collective bargaining throughout the construction industries and given it a chance to increase its membership greatly.

Urges Credit Terms For Russian Orders

CREDIT machinery for the proper handling of Russian commercial paper must be set up in the United States before Russian purchases expected to follow recognition will materialize in large volume, according to Charles J. Stilwell, vice-president, Warner & Swasey Co., Cleveland. He based his views upon the experience of his company in supplying Russia with machine tools required for its industrialization program. The company is now receiving a number of inquiries from Russia.

"After the revolution," Mr. Stilwell stated, "most American manufacturers sold to Russia only upon the basis of spot cash in New York. Later the Soviet Government began to insist upon a long-term payment basis. American manufacturers were not willing to extend terms ranging from 18 months to three years. Soviet buying, therefore, shifted largely to England and Germany. In these countries more desirable credit terms, from the Russian standpoint, were obtained, and prices at that time were somewhat lower than could be obtained in this country.

"Today, with a somewhat altered price situation and with recognition, Russia is apparently anxious to buy large quantities of machines and materials in the United States. Credit terms, however, still present difficulties. A practicable method of handling Russian acceptance paper, set up by the Government or the banks, will remove this barrier."

Plate Fabricators' Code To Be Heard on Dec. 5

WASHINGTON, November 28.—Public hearing on the code of the steel plate fabricating industry will be held at the Carleton Hotel on Dec. 5. This code was filed by the Steel Plate Fabricators' Association, claiming to represent 85 per cent of the industry. The hearing will be conducted by Deputy Administrator Barton Murray.

CAPTIVE MINE ELECTIONS
Nov. 22, 1933

| Mines | United Mine Workers | Independents |
|-------------------|---------------------|--------------|
| Leesburg No. 2... | 222-221 | 41-37 |
| Leesburg No. 5... | 172-170 | 75-70 |
| Harmarville | 479-473 | 23-20 |
| Indianola | 183-181 | |
| Ressellton | 325-321 | 44-43 |
| Allegheny | 91-89 | |
| National No. 1... | 217-215 | 33-32 |
| National No. 3... | 593-583 | 58-52 |
| Vesta No. 4..... | 580-569 | |
| | 322-318 | |
| Vesta No. 5..... | 541-534 | |
| Vesta No. 6..... | 354-349 | |
| Mather | 761-751 | |
| Crucible | 591-587 | 10-9 |
| Isabella | 593-587 | 20-19 |
| | 6,024 | 309 |

Nov. 23, 1933

| Mines | United Mine Workers | Independents |
|---------------------------------------|---------------------|--------------|
| Colonial No. 1.... | 548-546 | 285-284 |
| Colonial No. 3.... | 363-361 | 469-466 |
| Colonial No. 4.... | 395-393 | 399-397 |
| Filbert (including Ralph) | 514-512 | 405-403 |
| Footdale (including Buffington) | 500-497 | 536-531 |
| Maxwell | 420-419 | 112-111 |
| Gates (including Palmer) | 252-249 | 182-181 |
| Edenborn | 290-288 | 288-286 |
| Ronco | 170-168 | 338-337 |
| Leckrone No. 1... | 45-45 | 114-114 |
| Leckrone No. 5... | 56-55 | 63-63 |
| Leckrone Strip Plant | 15-15 | 113-109 |
| Kyle | 24-24 | 159-159 |
| Trotter | 8-8 | 231-229 |
| Shannopin No. 2. | 305-304 | 42-41 |
| | 3,905 | 3,736 |

(The two columns under each heading represent the range of votes on each "ticket," that is, the totals for the leader and the lowest. These results are exclusive of contested votes.)

Machine Tool Industry Names Code Supervisory Agency

Members Discuss Regulatory Problems and Policies at 32nd Annual Convention of N. M. T. B. A.

THE members of the machine tool and forging machinery industry, now operating under the recently approved "machine tool code," met at the Wardman Park Hotel, Washington, Nov. 25-28 to nominate and elect a "supervisory agency" consisting of seven members, which will function as the code authority.

This meeting coincided with the thirty-second annual convention of the National Machine Tool Builders' Association. The industry was well represented by an attendance of nearly 200 and developed angles of unusual interest.

One of these was the extremely able presentation of James W. Hook, president, Geometric Tool Co., and since Aug. 28 advisor to the Industrial Advisory Board. Mr. Hook reviewed from his standpoint of intimate contact with administrative developments the "aims and inferences of the industrial recovery act." His speech is reproduced in full elsewhere in this issue.

President E. A. Muller, of the N. M. T. B. A., presided at the general sessions on Monday and Tuesday. He paid tribute, in the name of the industry, to James E. Gleason, the industry's code advisor, to Ralph E. Flanders, member of the Industrial Advisory Board and previously a member of the machine tool code committee, and to Herman H. Lind, general manager of the association, for their capable and continuous efforts during code formulation and presentation.

Mr. Lind, in his report as general manager, stressed the necessity of individual educational work on the part of members of the industry, particularly as applied to their local congressional representatives. Business has been out of politics so long, said Mr. Lind, that it suffers a distinct disadvantage today. The attorneys and politicians in Congress need, he believes, the assistance which straight-thinking members of the industry can give in presenting the industry's particular needs and problems.

Ralph E. Flanders, president, Jones & Lamson Machine Co., and a member of the NRA Industrial Advisory Board, spoke upon "Our Industry's Code." Mr. Flanders, who spoke extemporaneously, gave an interesting picture of the hurdles which the in-

dustry had to surmount in its effort to secure an acceptable code. His experiences were drawn from his recent connection as chairman of the industry's code committee.

Special problems, mostly relating to the employment of labor under code provisions, were discussed in a session led by Henry Buker, vice-president, Brown & Sharpe. The importance of keeping accurate records of individual employment and particularly of overtime employment was stressed. The machine tool code is more liberal in this respect than are many others, for example, permitting 48 hr. per week for six weeks in each six months' period without overtime and without "averaging" to 40 hr. during the six months' period. It also makes permissible overtime beyond this (at overtime rates) for emergency work, as well as maintenance. "Emergency" work is interpreted as applying to customer emergencies where non-delivery may cause damage, as well as to "first person" emergencies. Members were cautioned, however, not to abuse this privilege.

Members of Supervisory Agency

One of the chief purposes of this meeting was to select the "supervisory agency" of seven. The following were chosen.

Elected to supervisory board:

Henry Buker, vice-president, Brown & Sharpe Mfg. Co.; James E. Gleason, president, Gleason Works; H. M. Lucas, president, Lucas Machine Tool Co.; R. M. Gaylord, president, Ingersoll Milling Machine Co.; A. H. Tuechter, president, Cincinnati Bickford Tool Co.; W. E. Whipp, president, Monarch Machine Tool Co., and H. H. Lind, general manager, National Machine Tool Builders' Association.

To these seven, the Administration may name three members without vote but with veto power.

The following new directors were elected: George H. Johnson, president, Gisholt Machine Co.; George H. Benson, Jr., vice-president, William Sellers & Co., Inc., and Norman D. MacLeod, treasurer, Abrasive Machine Tool Co.

Resolutions of condolence were expressed to families of the following members who died since the previous meeting of the association: George E. Randles, president, Foote-Burt Co.; E. C. Hunt, secretary-treasurer, Mo-

line Tool Co., and John S. Barnes of W. F. & John Barnes Co.

A resolution was passed expressing the association's appreciation of the work done by the industry's code committee in handling code preparation and presentation. This committee consisted of R. E. Flanders, E. A. Muller, H. H. Lind, J. G. Benedict and Henry Buker.

Daniel C. Roper, secretary of commerce, was the speaker at the formal dinner of the association on Monday evening. He outlined the importance of the machine tool industry as visualized by the Administration. Malcolm Muir, NRA division administrator in charge of machine tool and other capital equipment industries in code matters, spoke to the members on Tuesday morning. The National Industrial Recovery Act, said Mr. Muir, differs from all past regulatory acts. The latter were brought about by abuse of power by groups and were formulated for group regulation. In contrast to this NRA is regulation plus self-government.

In one sense, said Mr. Muir, NIRA is a labor law, but it offers industry the opportunity to wipe out vicious practices. The price that industry must pay for this is the more equitable sharing of profits to the end of stability of employment and the increase of national purchasing power. And this, said the speaker, is the essence of prosperity.

While a threat to the success of NRA may lie in the attitude of the Government if it should seek bureaucratic control or in management or labor if either should seek selfish advantage, Mr. Muir expressed the belief that compelling public opinion would center upon any offending party. He said that, while a minority administrative group might favor regimentation, all of the major NRA executives are for the fullest possible self-regulation of industry.

Within the next 60 days, said Mr. Muir, 80 per cent of industry, as measured by the number employed, will be working under codes.

Government will function in control if an industry fails to exercise the rights of self-government that have been provided. Compliance directors are being set up to officiate when necessary in code operations. These are

not to be confused with the compliance boards which had to do only with not yet codified industries which operated under the President's agreement.

The code authority set up by an industry will have nothing to do with the industry's later problems. But each industry may set up a sub-committee with equal membership of management and workers, which will provide self-regulation in labor matters. It is only where and when the code authority is unable to settle problems

of fair practice or the labor sub-committee to settle labor problems that the compliance director or the National Labor Board will function. Thus, said Mr. Muir, self-regulation is a matter strictly up to the industry.

The Administration, said the speaker, is now fully cognizant of the importance of a capital goods recovery. There will be a stimulation of demand for cost-reducing equipment, he believes, as soon as the various codes get into adequate operation.

for themselves, began to deplore the slowness by which he anticipated industries would come forward with codes. In public utterances he openly declared that the success of the adventure would depend entirely on the cooperation of industries and the efforts they made to speed up presentation of their codes. He made it apparent that he expected industries to be codified whether a majority of their members wanted or needed it or not, and he held up before the country the challenge that national recovery depended upon the cooperation that he got from industry itself. Put on the spot, as it were, by this cold picture, industries began feverishly to organize, write and present codes. So extensive was this effort that the National Recovery Administration was forced to expand its forces at a fantastic rate. From a small nucleus in late June it became a teeming organization of approximately twelve hundred employees within sixty days.

Cannot Now Make Industry the Goat

Industry, therefore, left no doubt about its willingness to cooperate and if national recovery does not follow, the NRA cannot claim lack of industrial cooperation as an alibi. By Sept. 1, over 800 industries had presented codes. Industrialists from every section of the country were invading the corridors of the Commerce Building in Washington, in an effort to get their codes through. The patience of those men in the face of about the most chaotic conditions that one could imagine was a perfect example of American good nature and will to cooperate. I had the privilege of sitting in with different groups of those men day and night during those early days and know whereof I speak. I had the opportunity to listen to the recitation of their problems and to catch the vision of American industry in the composite, and to observe first hand the tremendous complexities that have grown out of the interdependence of its various divisions, including the overlapping of divisional fields and of individual units within those fields; the intersectional problems, particularly as between North and South, large cities and small; the labor problems resulting from the use of the same type of labor in two wholly disassociated industries; the differences that exist between competitors and factions within associations and organized labor groups, and other complex inter-relationships almost too numerous to set down in coherent form. If ever I thought (and I believe I never did) that American industry could be successfully regimented or subjected to a super-planning board that could successfully coordinate and direct it, my experience in Washington during the three months just past has completely disillusioned me. But I shall refer to that later.

The attitude of industry growing out of the experience of its divisional groups that have presented codes is

Aims and Inferences of NIRA

AN address delivered by James W. Hook, president, the Geometric Tool Co., before the convention of the National Machine Tool Builders' Association, Nov. 27, at the Wardman Park Hotel, Washington.

TO any one who examines the genesis of the National Industrial Recovery Act it is apparent, I believe, that its framers had a few very definite objectives in mind which they hoped and believed the enforcement of the Act would accomplish. The Act, however, was drawn hastily, leaving little time for careful consideration of the meaning of the text between the lines or of its inferences in the light of the existing depression psychology, other new deal legislation and social experiments in foreign lands. The results, therefore, have not been exactly as were hoped for.

Original objectives, all good perhaps, have served only as a nucleus around which new objectives have grouped themselves day by day since the bill became law. Everybody who has a special industrial theory to propound, or a grievance to redress, has sought in the Recovery Act for legal support of his theories and desires. Inferences, therefore, have been and still are being converted into objectives at a rapid rate, thus putting upon the shoulders of the Recovery Administration an increasingly difficult task. What the outcome will be no one knows, but it is fair to assume, I believe, that unless the various interests get back to fundamentals and cease their everlasting fight for special privileges under the Act, that it will either fail completely or force upon all industry a very much greater control than was originally contemplated.

When the Act was drawn I think it was intended to be largely permissive. The aim was to assist those industries like textile, coal, oil and several others, that had been decrying the terrible effects of unbridled competition, to obtain relief by getting a majority of their members to prepare and present a code of fair competition which, when approved by the President, would be enforceable in the courts. There was no inten-

tion of forcing an industry that had no serious problems to solve, that paid decent wages to its employees and that maintained reasonable work schedules, to present a code. The major intentions of the Act were to put men back to work by permitting industries to enforce a "spread the work" principle and to eliminate sweat shop practices by requiring an industry so afflicted to establish a minimum wage.

Long hours and abnormally low wages were interpreted by the framers of the Act as the source and sinew of unfair competition and the means were provided to eliminate them. At the same time the right was established by which an industry that thought it had other unfair conditions to deal with could, if a majority of the industry agreed and the President approved, include in its code effective prohibitions against them without running afoul of the anti-trust laws. The President was given certain powers, which I'm glad to say he has not felt the necessity of using so far, to license industries and units of industries that were operating without the meaning and spirit of the Act and that continued to do so in defiance of the pleas of their competitors and contemporaries, or of labor employed by them. Provisions were also included to maintain the rights and autonomy of small industries and to insure that no code would promote a monopoly or make existing monopolies more monopolistic.

When the Act was passed these aims were pretty well understood by industry and were not very generally opposed. Some industrial organizations openly applauded it and proudly claimed a right to share in its conception and authorship. This was because those industries and units of industry that had been spreading work throughout the depression and maintaining wage schedules at decent levels, felt that the Act would not, and perhaps could not, reach or molest them.

They were soon to be disillusioned, however. The Administrator of the Act, goaded no doubt by those who saw opportunity to gain something

not all that one could wish for, yet in my opinion it is a perfectly natural one. Of all the codes presented, eight hundred up to Sept. 1, and approximately four hundred additional ones since that date, one hundred and twenty-five or thereabouts have received the President's approval. Thus we still have the representatives of approximately eleven hundred industries milling around Washington and fighting for the lives of their businesses against those who have no responsibility in a code once it has been approved. Every day, too, these industrialists read of new unofficial interpretations of this and that feature of the Act which, in many cases, profoundly disturb them and make them wonder if through their earlier efforts to cooperate they have not let themselves in for very much worse things in the future. They read the celebrations of college professors that the Act will certainly lead to permanent discipline of industry by the state, and observe the back-fire that has been set by prominent industrialists to offset it. They read that the good features of the Act and new features suggested by experience with it will be written into a new law that will not be limited by a definite expiry date. They observe with many misgivings the attitude of organized labor, and the report of strikes that have risen from misunderstandings and misinterpretations of the Act as it now stands. And finally, to their great regret, they note that business instead of improving under the impetus of codification is actually declining. Thus they ask—what has been permanently gained? Admitting that enforced spreading of work under provisions of codes already approved and the NRA has succeeded in giving more jobs to many of the unemployed, has this not been accomplished, they ask, largely at the expense of lowering the standard of living of many who already had jobs and of absorption of working capital of industrial units that could ill afford the loss? After seeing the figures of industry after industry that showed a depletion of from twenty to sixty per cent in capital and surplus of these industries during the past four years, I cannot wonder at their looking askance at being urged to risk further losses for the good of a doubtful cause. Their attitude is a perfectly natural one and should not be condemned or allowed to pass as unwarranted industrial resistance to national policy. Neither should it be permitted to encourage the anti-industry complex, using Virgil Jordan's phrase, that, as a result of incidental infractions of decent industrial procedure, has firmly gripped the public mind.

I think we may all be glad that industry made such a sincere effort to cooperate. Had it not done so the onus of failure of the recovery program, insofar as Title One of the Industrial Recovery Act is concerned,

would certainly have fallen upon its shoulders. Out of that failure and its incidence upon public psychology might have come a much stronger attempt to establish an enforced industrial discipline. Government regulation of industry may have given way to pleas for government direction and control. Leanings toward the latter, I believe, have received recently, and shall continue to receive, distinct checks as the public mind slowly realizes and understands that whatever the forces are that have acted to retard the recovery program they have not resulted from a hold back or passive policy on the part of industry. Perhaps it is not fair to infer that these checks came altogether from a reaction to the Recovery Act alone. Personally, I think they did not. While some undoubtedly have come from that quarter many have come also from the other acts that were passed by the present Congress during the fateful ninety days of last spring.

NRA Has Obscured Other Acts

Due to the dynamic personality of General Johnson, Title One of the National Industrial Recovery Act usurped the limelight during the entire summer and until the President's Gold Buying Program was started a few weeks ago and totally obscured Title Two of that Act and fifteen other amazingly important bills that were enacted into law between Mar. 4 and June 17, last. These sixteen Acts formed a well-knit pattern of which NIRA forms only a few of its well-defined and important lines. This pattern is "The New Deal" and in it has been woven a philosophy far removed from that which has guided our economic behavior for more than a century and a half. To those who have attached transcendent importance to the energetic words of General Johnson, I strongly urge that they inform themselves upon these other Acts. Should they do so they would probably see that much that they may be complaining about has no connection whatsoever with the immediate powers of NRA. I could think of nothing more salutary to the economic future of this nation than for every thinking citizen to master the plain meaning of each of those sixteen Acts. It is largely by correlating these plain meanings and noting their joint effects in the completed pattern that one can possibly understand the inferences that are continually being drawn by those who pose as students of the new order of things.

Most of these students blame the ills of the present upon over-production. Because of an unjust distribution of the national income, they say, those who received a lion's share bought too heavily in stocks and bonds which, for the most part, represented investments in producing capacity. The result was over-production which caused people to be dropped from payrolls

and the restriction of purchasing power. This in turn tended still further to curtail consumption and payrolls. Thus continued the spiral round and round, until production slumped to that barely necessary to produce the necessities of life. The movement they asserted could be stopped only by curtailing production and increasing purchasing power of the masses by the method of spreading work, raising prices, and distributing mobile wealth among those who were bogged down by debt and the unemployed.

Curtailement of Production

Launching the attack from that quarter the Agricultural Adjustment Administrator, under authority of one of the sixteen Acts above referred to, began to offer rewards to farmers who would agree to curtail production. The money used was to be taken from the public at large in the form of processing taxes, which is a means of spreading national income or wealth by taking from one and giving to another. The National Recovery Administrator, under authority of another of the sixteen Acts, set about to spread industrial income among more workers by shortening hours and taking a larger share of the income from employers by all but forcing them to pay increased wages. He also undertook to curtail industrial production in the future by permitting and, at the beginning at least, encouraging codes to outlaw expansion of producing capacity. The Relief, Public Works and Mortgage Refunding Acts would effectively spread a large block of the mobile wealth of the nation, and currency inflation if it comes will act to the same purpose by taking away from creditors and giving to debtors.

Thus we can see all these Acts working in unison to accomplish two fundamental results—*first*, to curtail and control production, and, *second*, to more evenly distribute the national income or its corollary national wealth. To aid in the accomplishment of these two objectives we see further evidence of a trend toward government control in the Acts concerning banking and sales of securities, public utilities, coordination of transportation and the resolution which repealed the gold clauses in all existing contracts. Altogether, it is expected that the attainment of these two objectives will increase consumption. This will be followed quickly by an increase in production and a demand for more men and women to man the productive processes.

Must Consider Effect on Total Income

My observations have led me to believe that much can be said for one of these objectives and much against the other. The object of the most orthodox of economic systems is to make it possible for every person to obtain a share of the national income sufficient to enable him to live in reasonable ease and comfort. No thought-

ful person will say that the national income has been distributed with equality in the past. Any effort, therefore, that the Government engages in to improve that distribution, so long as it does not hamper the creation of income itself, will be approved and even applauded. But how it would be possible to help matters by more equitably spreading the national income on the one hand and curtailing production, which is the source of all income, on the other, is entirely beyond me. Yet that is the plain inference of the two objectives of the "New Deal" legislation.

If it is true that the principal objective of all economic systems is to equitably spread the national income while keeping the total of that income at the maximum, then what happens when production is curtailed? Obviously, a decrease in national income. How then can we increase the standard of living of our people if we curtail the production of things that go to make up that standard? The answer is, we can't. Production is the very foundation of our economic life. It is purchasing power. It is the basis of credit. It is wealth itself.

I shall refrain from carrying this part of the discussion further. Others, far better informed than I am, have shown the effects of technology and machinery upon the production and distribution of the national income. Suffice to say that I do believe that a way must be found to divert a fair share of the savings that improved methods and machinery effectuate in the productive processes into assisting those who are displaced, for a reasonable period while they are adjusting themselves to other tasks, either by the payment of dismissal wages or some other sound and effective method.

I also have some sympathy with the effort to better manage the production of agricultural commodities to avoid waste of our natural resources. But I should like it better if it were attempted by the Government leasing marginal lands rather than by subsidizing the farmers to let these lands lie fallow.

A Sinister Provision

The National Industrial Recovery Act would attempt not only to shorten hours, an objective good in itself, but also to establish a maximum number of hours which any unit of industry may work its employees. This arbitrary setting of the maximum working week, in my opinion, is the most sinister and dangerous single feature of the entire Act. It presupposes that idle labor can be called to new tasks at will and that it will remain efficiently on the job until over-plus of orders are executed, whether it takes twenty-four hours or six weeks, or any other period. I declare that such a supposition is fallacious. When a business is subjected to a fixed working week beyond

which it cannot work its employees, it will find itself effectively stymied the minute its volume of orders overreaches the maximum output of its equipment. For, when that time comes, it cannot hold up orders until it has enough business on hand to employ a second shift, neither can it afford to install added machinery just for the purpose of executing a limited over-plus of business. The only way it can solve such a problem, barring refusal to accept more business, is to work its existing forces beyond the maximum week. Will it do this? I think so. In fact, there is much evidence that that is precisely what is happening in many individual plants right now.

Flexible Work Week With Overtime Penalty

How much better it would have been had the Act called for the establishment of a normal week in various industries beyond which they could not work without paying penalty wages. The latter may have been time and a quarter for the first step, time and a half for the second, and so on up to double time when inordinately long hours were required. Such a procedure would have made the Act self-enforcing. Employees would demand the extra pay for overtime work and employers would be encouraged to use all reasonable measures to get along without working overtime. Under the requirements of the Act as at present written, maximum hours must be established. By hard fighting and by agreement to pay overtime wages most industries have been able to establish the right in their codes to work a few extra hours during each six months' period. My opinion is that enforcement of the Eighteenth Amendment will have been a picnic in comparison to future enforcement of the fixed maximum week.

Out of the fixed week feature of the bill will emanate most of our labor problems. Here exists the opportunity that organized labor has so long sought; namely, the power to put bargaining power into the hands of the working man. By limiting hours labor shortages are created and it is when labor is scarce that demands can be made upon the employer with good chances that they will be granted. Wages at the outset are not so important. They will be taken care of just as soon as business increases sufficiently to produce labor shortages. And with the principle of minimum wages also accepted in the Act, it is very likely that the attempt will be made, when the time is propitious, to establish these for crafts and special skills.

Some industries even now invite a system of minimum wages for employees above the common labor class. I was the adviser for one industry in the metal working field that insisted upon it. Its claim was that without minimum wages all the way up there

would be no way to check unbridled and cut-throat competition. Its wishes were not granted, however, solely because the Recovery Administrator took a definite stand against such a system on the theory that it would cause too much delay in getting codes through.

Labor Will Capitalize Pick-Up

Labor organizations will also demand more and more power if the Recovery Act shows promise of increasing its control over industry. During the months of August and September when this tendency was strong labor was demanding the right to be represented on all code authorities. Recently, with the Act being subjected to pretty severe criticism, these demands have not been so strong. My opinion is, however, that if the cordon of Government direction and control tightens that organized labor will demand and be given a voice in the high councils of that control.

Section 7a will be of inestimable help to labor also. It gives employees the right to organize and bargain collectively. Coupled with the fixed working week and minimum wage it sets the stage for almost unlimited labor domination the minute business improves sufficiently to absorb the skilled and specialized workers among the unemployed.

I don't mean to predict that unfair advantage will be generally taken. If it is and is not curbed, then the recovery movement to avoid floundering will force the Administrators of this Act to take the problem firmly in hand themselves. Personally, I cannot see any other course that the Administrator could take in the event of unreasonable demands on the part of labor. Much more important to NRA than the pleasing of labor groups is a profitable industrial economy and if the Recovery Administration has the responsibility of making it possible for industry to be successful and profitable, it will not be likely to brook demands that are unreasonable or that endanger the obtaining of that objective. Thus it would appear that if industry is headed for governmental direction and control such direction and control must apply to all elements that go to assure industrial success and profits, including labor as well as capital, employees as well as employers.

Will the Course Be Left or Right?

But are we headed for such direction and control? Minds differ on that question. It depends upon whether you think the President and his advisers and Congress, when it reconvenes, will turn to the left or to the right. As this is written (November 24th) it appears altogether probable that the President, himself, will take some momentous step one way or the other before Congress returns. With the country boiling with fear of currency inflation, some demanding it,

others shouting it down, no one can say if the "New Deal" will hold together or not. If it fails in one place, particularly in so vulnerable a one as that of Government credit and finance, the whole thing may be so materially altered as to bring it back to principles we better understand. If it does not fail in any one of the essentials, or if it fails and *no one recognizes the fact* it would seem to me that we are headed for an experiment with a super-planning board of some kind.

I have always objected to a super-planning board empowered to force its will upon American industry. I have never felt that such a board of super-men could be found in this country, or the world, who would be wise enough, or endowed with mental capacity great enough, to master the enormous detail of American business and finance sufficiently to direct its mass movements toward a certain goal. Since June, however, I have felt the ship listing in that direction and with others have given much thought to the kind of a super-board I should like best if it becomes apparent that one must come. Mr. Gerard Swope brought the matter into the open on the afternoon of Nov. 1 when he addressed a meeting of the planning council of the Department of Commerce. The plan he proposed received wide publicity and much criticism. I was one of the group who registered adverse criticism. I felt that his plan as outlined would, if adopted, effectively assure the domination of all industries in this country by a half-dozen of the larger ones. The basis of my objection was to the manner provided of selecting the industrial members. In the last analysis it seemed to me that under the plan proposed by Mr. Swope they would be appointed by the directors of an expanded U. S. Chamber of Commerce. If so appointed, codified industry would have blessed little to say who they should be.

Now I don't mean to say that the directors referred to would not select good men. Probably they would. But would industries large and small be satisfied with such an undemocratic method of selection? I think not.

Choosing a Super-Board

My suggestion for selecting those members would be by vote of the members of the code authorities of all codified industries. These men are likely to be not only the leaders of these industries, but also the ones in whom the members have implicit confidence; men before whom they would be willing to lay the vital statistics of their businesses. When 500 codes have been approved by the President, and not before, the members of all these code authorities should be invited to form an association. This

association should then select from its membership a council of 100, who in turn would select the industrial members of the super-board. By waiting until 500 codes had been approved, there would be assurance that small industries would not be dominated by the large.

The association formed should not be tied to the apron strings of any existing organization. It should start off with a clean slate. It should not be made heir to traditional differences and animosities that are present in nearly all established organizations, or to the jealousies that exist between them. And, above all, it must be representative of codified industries and not cluttered up with a conglomerate membership of local chambers of commerce and manufacturers' associations whose responsibilities are not definite and whose interests in large measure are centered in other fields. For such organizations to be given a voice in the selection of those who would sit in judgment on industrial acts and policies at the top, except as they expressed themselves through the code authorities of the industries of which they were a part, would, in my judgment, be wrong.

Thus, as you will observe, my plea is that the set-up shall insure that the voice of small industry and small units of industry shall certainly be heard in the councils of any super-planning board that might be brought into being. Whether the "powers that be" like it or not, the industrial philosophy of this nation emanates from the smaller units of industry. If I have learned one thing from my experience here in Washington it is just that. My great hope is that Mr. Roosevelt and others in the seats of power of our Government may have learned it also.

Obviously, a super-planning board, if it is created, will not be constituted wholly of members from industry. Three other groups will claim the right of supplying members as well. The first of these is labor, the second government, and the third the blessed consumer, without whom we should all dry up and die.

Lack of time forestalls my going into the methods by which the representatives of these groups might be selected, or the industrial courts that would have to be established to settle code infractions and complaints of labor. Neither does it allow for any discussion of the complex organization that would be necessary to coordinate industry, after gathering the facts necessary to show the way.

Best Pleader Will Get the Breaks

Suffice to say that if such a super-board arrives, industry itself will have much of the work to do. Not only will it be required to supply the data required by those sitting in judgment at the top, but it will also

have to present that data and show its effect upon the economic structure. If a quarrel should arise between two industries, the one that does the best job of fact-finding and case-presenting will be very likely to get the breaks. This will bring about errors in judgment that on occasions will be colossal. I shudder to think of them.

My closing plea is that we continue to cooperate with the Administrators of the act to the very best of our abilities. Much of the act is good. It has done more to eliminate child labor and sweatshop practices than all the acts that have been placed on the statute books during the past quarter of a century. It has caused a very great spreading of work and on the whole has increased payrolls, and whether or not you believe that such of these benefits as could be credited to the act produced an actual increase in purchasing power, it is fair that you give them the benefit of the doubt. The facts unquestionably do remain that many more are on payrolls today than a year ago and that industrial production has markedly increased in the meantime. These accomplishments are most desirable any way you look at them.

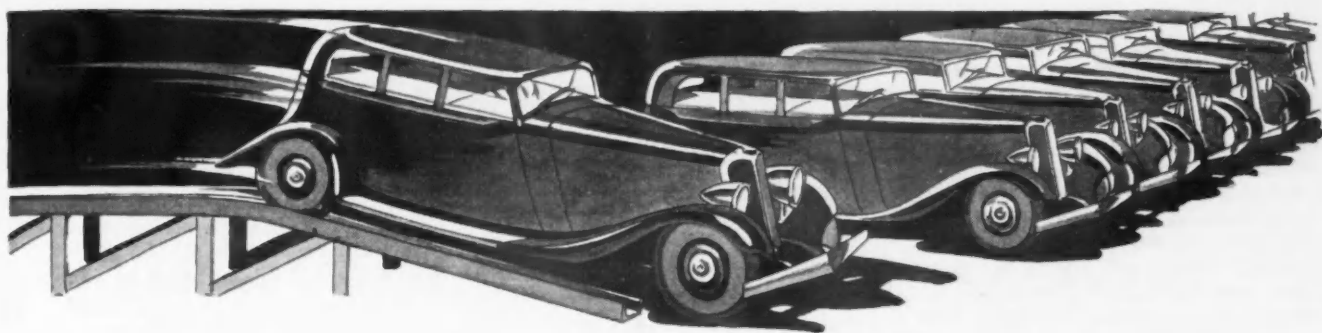
Let us not forget, either, that the Administrators would welcome suggestions from us as to what we think the future of the act should be; whether it should be broadened or contracted, or whether it should be left unaltered or repealed entirely. If you have any thoughts on the subject, I suggest that you pass them along to those in authority, remembering that the future of the act still reposes in the lap of public opinion. If the latter fails to assert itself, society cannot complain if its wishes are ignored at the crucial moment, or if Congress gives it something it does not want.

OBITUARY

JOHN C. MOON, president of the Landis Machine Co., shoe repair machinery manufacturer, St. Louis, former carriage manufacturer, and former president of the Moon-Hopkins Billing Machine Co., which was purchased by the Burroughs Adding Machine Co. in 1921, died on Nov. 21 at his home after an illness of several months. He was 80 years old.

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CHARLES B. HOUCK, president, Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., since 1929, died at his home at Hazleton, Pa., Nov. 21, aged 65 years. He had been a director of the company for many years and previous to becoming president was general manager of the Wilkes-Barre & Hazleton Railway Co., and Lehigh Traction Co., both of Hazleton.



▲ ▲ ▲ THIS WEEK ON THE ASSEMBLY LINE ▲ ▲ ▲

November Output Estimated at 65,000 Cars, December at 125,000

Detroit, Nov. 28

FOR an automotive man even to intimate that his company was contemplating manufacture of a new car has always been considered an act of treason. The industry has gone along on the naive theory that no one had thought that a new car was "just around the corner," despite the fact that the advance ballyhoo of the annual automobile shows is in itself an admission of a new car's imminent introduction and that for years on end new models have been put on the market in December and January.

It was surprising, therefore, for General Motors to make public announcement of its 1934 cars a month ahead of their initial display. By this stroke it set the pace for the industry by seeking to popularize coil springs and independent front wheel suspension under the name "knee action wheels," and clinched for itself in the public mind the fact that it was the originator of this mechanical innovation so far as the American market is concerned.

Four days after the General Motors announcement, Hudson stated officially that "a thoroughly tested system of independent 'knee-action' springing would be available on 1934 Terraplanes and Hudsons."

Thus the term "knee action" seems destined to be appropriated by the industry as the simplest, most easily understood description of independent wheel suspension. It will be the big selling argument for 1934.

Front-end Designs to Differ

Front-end design, of course, will differ in various makes of cars. The General Motors cars will have no

front axle, whereas Hudsons and Terraplanes will. Says the Hudson statement, "Instead of doing away with the axle, which we feel is needed for stability, we have given it a vertical flexibility which permits us to spring each wheel independently . . . without the slightest sacrifice of the advantages contributed by the latest type of shock absorbers, modern splayed springs and tested steering mechanism." Hudson calls its springing system the "Axleflex" type. It will give next year's car buyers the choice between this new type and the conventional axle design.

Chrysler-made cars, it is understood, will be equipped with independent wheel suspension and coil springs, the front axle being eliminated as on General Motors cars.

It is believed that Ford will make no hasty change to coil springs, but will retain transverse springs on its revamped V-eight car, which it is reported will be shown for the first time at the Ford Exposition of Progress opening in New York on Dec. 9. It is claimed that the general appearance of the new Ford is similar to that of the present model 18.

Large Expenditures for Tooling

The best evidence of optimism in the automobile industry is offered by large expenditures for equipment for retooling purposes. Predictions for a good year in 1934 are not half so convincing as an actual outlay of cash. For this reason particular importance is attached to a late development at the Buick Motor Co.

Surveying the outlook earlier in the year, Buick decided that the market would not be good enough to justify an expensive retooling program

for 1934. It was contemplating the widening of its line by the addition of a smaller car, but decided to hold off until 1935. Now this decision has been set aside and plans are being made for adding a small companion car to its present series to bear the Buick name and to sell in the \$750-\$850 class. The company is taking bids this week on large amount of equipment for its proposed small car which probably will not be in production before about April 1. The first car of the Buick's regular 1934 series came off the assembly line at Flint today and production will be expanded as rapidly as possible.

Manufacture of a lower-price Buick is a natural development, in view of the shrinkage in recent years in the market for cars selling at from \$1,000 to \$2,000. The small car, a straight-eight, valve-in-head job, would be in direct competition with the small Studebaker and Nash sixes, Chrysler six, Auburn eight and Graham six and eight. It would aid Buick materially in securing volume production for its giant plant at Flint, now partially occupied by parts departments.

General Motors to Blanket Market

Evidence piles up to support the statement that General Motors next year will completely blanket the automobile market, from the lowest price class up to the luxury group. There will be no chance for a competitor to ease into an unguarded portion of the market, as Chrysler did the past year with its small Dodge six.

It is understood that the La Salle will be a straight-eight instead of a V-eight and will be priced lower than at present. The recent rearrange-

ment of the Cadillac plant has included provision for machining a straight-eight instead of V-eight engine for the La Salle division.

The ambitious program of General Motors is the answer to Chrysler's threat. Not long ago General Motors' officials got a hearty laugh out of an advertisement showing Walter P. Chrysler pointing to a Plymouth and asking, "Is this destined to be America's next No. 1 car?" This is no longer a laughing matter. Not that General Motors seriously entertains the idea that Plymouth will threaten Chevrolet's supremacy, but rather that it is high time that some of Chrysler's soaring ambitions be deflated before they get out of hand.

One of the curious developments of General Motors-Chrysler fight is that Mr. Ford is left largely out of the picture. General Motors looks on Chrysler as its chief competitor in 1934 and Chrysler in turn is directing its efforts at overcoming General Motors. Perhaps both are making a sad mistake, for Mr. Ford is a business rival always to be reckoned with and often is at his best when he seems at his worst.

Large Die Contracts Placed

Despite all the die work which is reputed to have been sent out of Michigan, enough of it remained unplaced at the end of the recent strike for several local plants to obtain large contracts. One independent shop has booked an order for about \$500,000 worth of tools and dies.

Chevrolet's December schedule is said to call for 35,000 to 40,000 cars, but depends on how soon its production gets squared away. For January Chevrolet tentatively is counting on making 70,000 units. The Fisher Body plant at Cleveland, which works on Chevrolet body requirements, has met with delays resulting in hold-ups of steel shipments. Chevrolet is making 40 to 45 trucks a day on a Government order and is reported to be preparing to make deliveries at the rate of 300 a day by Dec. 1.

The Dodge plant, a key division in the Chrysler organization since it makes parts for all Chrysler cars, is down for inventory and retooling and will not resume until early in December. Some Chrysler suppliers have been asked to begin delivering parts on new contracts on Dec. 4, but others have not yet received releases. Plymouth is said to be working on an order from the Chrysler management to get out 6500 units of the current model as soon as possible. The new Plymouth, which is understood to be slightly longer but changed little in exterior lines except for fender valances, is reported to be scheduled to make its public bow Dec. 16.

Ford May Roll Strip Steel

Ford is considering plans for conversion of its 14-in bar mill into a strip mill, principally to roll side rail

stock for its passenger car frames. Heretofore it has bought this stock from outside sources. It is probable that the design of the mill will be so changed and new equipment installed to permit production of either bars or strip steel. Construction of a sheet mill at Dearborn is said to be still a topic of discussion.

Steel men point out that the Ford steel plant originally was built to make alloy steel and with its present equipment, which calls for handling of an ingot about half the size of that of any steel company, it is not adapted to economical manufacture of commercial steel.

If Mr. Ford goes ahead with his strip steel program, it will not only remove considerable tonnage from the market, but also intensify competition in the local market as strip steel makers seek other outlets.

Pontiac Decides on Braking System

Pontiac is reported to have decided upon brake drums made from G.M.C. 1070 steel with longitudinal grooves rolled into the outer rim and with a polished wearing surface. Its 1934 car will have a Bendix braking system instead of that made by Chevrolet.

The Michigan Steel Tube Co. is now filling an order for about 100 miles of welded steel pipe which Whitehead & Kales is fabricating into conveyor carriers for the Chrysler Corp.

The Hudson plant is closed at present, but will begin turning out new Terraplanes and Hudsons early in December. Bodies of both cars will be greatly altered in appearance. The Hudson body department has been completely revamped. Distributors and dealers will be shown the new cars at the factory on Dec. 5, but pub-

lic announcement will be deferred until the New York show.

Almost all manufacturers have been caught short on current cars. General Motors divisions have few cars on hand. Buick's main retail store in the General Motors Building hasn't a car on its floor. Hudson has so reduced field stocks that its dealers have only one car each.

Ford is reported to have 30,000 to 35,000 cars scheduled for production in December. All of them will be 1934 models. Ford expanded its output in the past week.

Acceleration of manufacturing activities has forced upward revision of November production to 65,000 units. Although almost all companies will be slow in starting assemblies of new cars, it now looks as though December output will be 125,000 units, as against an estimate of 100,000 a week ago.

Citroen to Buy Machine Tools and Dies in U. S.

REPRESENTATIVES of Andre Citroen, French automobile manufacturer, are now in the United States to place orders for machine tool equipment, dies—particularly body dies—and other machinery in connection with tooling up for new models. Total expenditures in this country will amount to from \$4,000,000 to \$5,000,000. All orders will be placed in the next two weeks through the Citroen American office in the First National Bank Building, Detroit.

The French group consists of C. Kazimir, production manager for Citroen, and eight production officials, together with E. R. Frederick, Citroen American representative.

PERSONALS

OTTO KAFKA has opened an office at 2 Rector Street, New York, to engage in foreign trade in steel and steel products, as well as machinery.

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COM. HORACE T. DYER has been appointed manager of the newly-created marine department of the Combustion Engineering Co., Inc., New York. The department will take over the work previously handled by the Hedges, Walsh-Weidner Co., marine division subsidiary of the Combustion company. James S. Malseed, representative of the Hedges company at Washington, will continue in the same capacity with the Combustion company.

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WILLIAM J. CORBETT, formerly works manager and assistant to the presi-

dent of the Fort Pitt Steel Casting Co., has been made works manager of the Atlas Steel Casting Co., Buffalo. After his graduation from the Carnegie Institute of Technology in 1914, he became identified with the American Steel Foundries as a special apprentice and a year later was made production engineer of the Chester, Pa., works of the company. During the war he served as assistant superintendent in charge of the making of castings at the Watertown arsenal. From 1919 to 1923 he was assistant to one of the vice-presidents of the American Steel Foundries. Mr. Corbett then engaged in association work as industrial engineer and assistant director of the Electric Steel Founders Research group and later as secretary-manager of the Steel Founders Society of America.

SUMMARY OF THIS WEEK'S BUSINESS

Market Sentiment Improves as Output Shows Contra-Seasonal Stability

Rail Orders, Accelerating Activity in Automobile Industry and Completion of Price Changes Strengthen Confidence—Scrap in First Rise Since August

AT a time of the year when the trend of output is usually downward, iron and steel releases are showing a slight gain, which is being reflected in mill operations. Although the production schedule at the beginning of the week was reported as 26.8 per cent as compared with 26.9 per cent seven days previously, actual operations are again running somewhat ahead of schedules, averaging close to 28 per cent as compared with 27½ per cent a week ago. The improved showing of production has been reflected in the scrap market, which is always sensitive to a change in the operating trend. An increase in the price of heavy melting steel at Chicago has caused THE IRON AGE scrap composite to rise from \$9.83 to \$9.92 a gross ton, its first advance since the second week in August.

While it is still too early to make a definite forecast of a contra-seasonal increase in steel production in December, a further upward revision of automobile production schedules, the placing of several rail orders and the appearance of additional public works projects have all contributed to a feeling of greater confidence. Expectations are tempered by the slowness with which certain public projects are maturing and by new uncertainties which may tend to delay or curtail part of the rail buying program, factors which may prevent any appreciable upturn in production from developing before January.

MOST of the price changes contemplated for the first quarter of next year have now been filed. No advances in pig iron prices have been made except in New England and eastern Pennsylvania. Prices on plates, shapes, bars, strips and most finishes of sheets have been reaffirmed without change. In sympathy with the recent advances in tin plate, tin mill black plate has gone up \$3 a ton, long ternes have risen \$7 a ton and terne plate has been marked up varying amounts, the increase in the base being \$11 a ton. Revisions have been made in the discounts on standard commercial seamless boiler tubes reflecting an average advance of \$5.50 a ton. Base discounts on lap-weld steel boiler tubes are to be changed in line with the revisions of discounts on hot-rolled seamless tubes. Cold-finished steel bars will be advanced \$3 a ton to 2.10c. a lb., Pittsburgh. Bolt and nut manufacturers, owing to the increased cost of their raw materials, will announce upward price revisions shortly. Cast iron pipe has been marked up \$1 a ton at Birmingham.

THE recent advances of \$1 a ton on wire rods, \$2 a ton on plain wire and \$5 a ton on wire nails are effective Dec. 4, rather than Dec. 1. This is also true of most of the other steel products on which price changes have been filed. Technically steel companies will be permitted, under the code, to book first quarter business at the old prices during the first two days of December. Whether this will actually be done is, of course, questionable, but it is at least certain that the advances will stimulate specifications as well as spot purchases at the old market levels.

THE Chicago & North Western and the Chicago & Eastern Illinois have applied to the Interstate Commerce Commission for the approval of Government loans for the purchase of rails and fastenings. The North Western will buy 65,000 tons of rails and 18,000 tons of fastenings, while the Chicago & Eastern Illinois will purchase 4000 tons of rails together with necessary track supplies. Demands for collateral and other conditions prerequisite to the granting of loans have discouraged roads from borrowing, with the result that many lines will finance their own purchases, if they place any orders at all. As a consequence, the amount of rail tonnage that will finally be bought is in doubt.

Railroads which have already made direct purchases include the Burlington, which has ordered 25,000 tons, the Northern Pacific, which has placed 6500 tons, and the Norfolk & Western, which recently closed for 17,500 tons.

Automobile output continues to improve and estimates of November assemblies have been revised upward from 55,000 to 65,000 units. Similarly, the December output is now placed at 125,000 cars as against an estimate of 100,000 cars a week ago.

Iron and steel exports in October totaled 164,755 tons, a gain of 55,956 tons over September.

STEEL production has increased five points to 50 per cent in the Wheeling district, three points to 35 per cent in the Valleys, three points to 35 per cent at Buffalo and one point to 18 per cent at Philadelphia. Output at Chicago is off fractionally to 26½ per cent. The Pittsburgh rate is unchanged at 21 per cent.

THE IRON AGE composite prices for pig iron and finished steel are unchanged at \$16.61 a ton and 2.015c. a lb.

▲ ▲ ▲ A Comparison of Prices ▲ ▲ ▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

| Per Gross Ton: | Nov. 28, 1933 | Nov. 21, 1933 | Oct. 31, 1933 | Nov. 29, 1932 |
|--------------------------------------|---------------|---------------|---------------|---------------|
| No. 2 fdy., Philadelphia..... | \$18.26 | \$18.26 | \$18.26 | \$13.59 |
| No. 2, Valley furnace..... | 17.50 | 17.50 | 17.50 | 14.50 |
| No. 2 Southern, Cin'tl..... | 18.13 | 18.13 | 18.13 | 13.82 |
| No. 2, Birmingham..... | 13.50 | 13.50 | 13.50 | 11.00 |
| No. 2 foundry, Chicago*..... | 17.50 | 17.50 | 17.50 | 15.50 |
| Basic, del'd eastern Pa..... | 17.76 | 17.76 | 17.76 | 13.50 |
| Basic, Valley furnace..... | 17.00 | 17.00 | 17.00 | 13.50 |
| Valley Bessemer, del'd P'gh.. | 19.76 | 19.76 | 19.76 | 16.89 |
| Malleable, Chicago*..... | 17.50 | 17.50 | 17.50 | 15.50 |
| Malleable, Valley..... | 17.50 | 17.50 | 17.50 | 14.50 |
| L. S. charcoal, Chicago..... | 23.54 | 23.54 | 23.54 | 23.17 |
| Ferromanganese, seab'd car-lots..... | 82.00 | 82.00 | 82.00 | 68.00 |

*The switching charge for delivery to foundries in the Chicago district is 60c per ton.

Finished Steel

| Per Lb. to Large Buyers: | Nov. 28, 1933 | Nov. 21, 1933 | Oct. 31, 1933 | Nov. 29, 1932 |
|--|---------------|---------------|---------------|---------------|
| Hot-rolled annealed sheets, No. 24, Pittsburgh..... | 2.25 | 2.25 | 2.25 | 2.10 |
| Hot-rolled annealed sheets, No. 24, Chicago dist. mill.. | 2.35 | 2.35 | 2.35 | 2.20 |
| Sheets, galv., No. 24, P'gh.. | 2.85 | 2.85 | 2.85 | 2.85 |
| Sheets, galv., No. 24, Chicago dist. mill..... | 2.95 | 2.95 | 2.95 | 2.95 |
| Hot-rolled sheets, No. 10, P'gh | 1.75 | 1.75 | 1.75 | 1.55 |
| Hot-rolled sheets, No. 10, Chicago dist. mill..... | 1.85 | 1.85 | 1.85 | 1.65 |
| Wire nails, Pittsburgh..... | 2.10 | 2.10 | 2.10 | 1.95 |
| Wire nails, Chicago dist. mill | 2.15 | 2.15 | 2.15 | 2.00 |
| Plain wire, Pittsburgh..... | 2.10 | 2.10 | 2.10 | 2.20 |
| Plain wire, Chicago dist. mill.. | 2.15 | 2.15 | 2.15 | 2.25 |
| Barbed wire, galv., P'gh..... | 2.60 | 2.60 | 2.60 | 2.60 |
| Barbed wire, galv., Chicago dist. mill..... | 2.65 | 2.65 | 2.65 | 2.65 |
| Tin plate, 100 lb. box, P'gh.... | 4.65 | 4.65 | 4.65 | 4.25 |

Rails, Billets, etc.

| Per Gross Ton: | Nov. 28, 1933 | Nov. 21, 1933 | Oct. 31, 1933 | Nov. 29, 1932 |
|---------------------------------|---------------|---------------|---------------|---------------|
| Rails, heavy, at mill..... | \$36.37 1/2 | \$36.37 1/2 | \$37.75 | \$40.00 |
| Light rails at mill..... | 32.00 | 32.00 | 32.00 | 30.00 |
| Rerolling billets, Pittsburgh | 26.00 | 26.00 | 26.00 | 26.00 |
| Sheet bars, Pittsburgh..... | 26.00 | 26.00 | 26.00 | 26.00 |
| Slabs, Pittsburgh..... | 26.00 | 26.00 | 26.00 | 26.00 |
| Forging billets, Pittsburgh... | 31.00 | 31.00 | 31.00 | 31.00 |
| Wire rods, Pittsburgh..... | 35.00 | 35.00 | 35.00 | 37.00 |
| | Cents | Cents | Cents | Cents |
| Skelp, grvd. steel, P'gh, lb... | 1.60 | 1.60 | 1.60 | 1.60 |

Scrap

| Per Gross Ton: | Nov. 28, 1933 | Nov. 21, 1933 | Oct. 31, 1933 | Nov. 29, 1932 |
|---------------------------------|---------------|---------------|---------------|---------------|
| Heavy melting steel, P'gh.... | \$11.50 | \$11.50 | \$11.75 | \$9.00 |
| Heavy melting steel, Phila... | 9.75 | 9.75 | 10.00 | 7.25 |
| Heavy melting steel, Ch'go... | 8.50 | 8.25 | 8.75 | 5.87 1/2 |
| Carwheels, Chicago..... | 9.00 | 9.00 | 9.50 | 7.00 |
| Carwheels, Philadelphia..... | 10.75 | 10.75 | 11.75 | 9.25 |
| No. 1 cast, Pittsburgh..... | 11.25 | 11.25 | 11.75 | 9.50 |
| No. 1 cast, Philadelphia..... | 11.25 | 11.25 | 11.50 | 8.00 |
| No. 1 cast, Ch'go (net ton)... | 8.50 | 8.50 | 9.00 | 6.25 |
| No. 1 RR. wrot., Phila..... | 11.00 | 11.00 | 11.00 | 7.50 |
| No. 1 RR. wrot., Ch'go (net)... | 7.25 | 7.25 | 7.75 | 4.50 |

Finished Steel

| Per Lb. to Large Buyers: | Cents | Cents | Cents | Cents |
|--------------------------------|----------|----------|----------|---------|
| Bars, Pittsburgh..... | 1.75 | 1.75 | 1.75 | 1.60 |
| Bars, Chicago..... | 1.80 | 1.80 | 1.80 | 1.70 |
| Bars, Cleveland..... | 1.80 | 1.80 | 1.80 | 1.65 |
| Bars, New York..... | 2.08 | 2.08 | 2.08 | 1.95 |
| Tank plates, Pittsburgh.... | 1.70 | 1.70 | 1.70 | 1.60 |
| Tank plates, Chicago..... | 1.75 | 1.75 | 1.75 | 1.70 |
| Tank plates, New York.... | 1.98 | 1.98 | 1.98 | 1.898 |
| Structural shapes, Pittsburgh | 1.70 | 1.70 | 1.70 | 1.60 |
| Structural shapes, Chicago.. | 1.75 | 1.75 | 1.75 | 1.70 |
| Structural shapes, New York | 1.95 1/4 | 1.95 1/4 | 1.95 1/4 | 1.86775 |
| Cold-finished bars, Pittsburgh | 1.95 | 1.95 | 1.95 | 1.70 |
| Hot-rolled strips, Pittsburgh | 1.75 | 1.75 | 1.75 | 1.45 |
| Cold-rolled strips, Pittsburgh | 2.40 | 2.40 | 2.40 | 2.00 |

Coke, Connellsville

| Per Net Ton at Oven: | Nov. 28, 1933 | Nov. 21, 1933 | Oct. 31, 1933 | Nov. 29, 1932 |
|---------------------------|---------------|---------------|---------------|---------------|
| Furnace coke, prompt..... | \$3.75 | \$3.75 | \$3.75 | \$1.75 |
| Foundry coke, prompt..... | 4.25 | 4.25 | 4.25 | 2.75 |

Metals

| Per Lb. to Large Buyers: | Cents | Cents | Cents | Cents |
|---------------------------------|-------|-----------|-------|-------|
| Electrolytic copper, refinery.. | 8.00 | 8.00 | 8.00 | 5.00 |
| Lake copper, New York..... | 8.25 | 8.25 | 8.25 | 5.25 |
| Tin (Straits), New York.... | 53.25 | 55.62 1/2 | 49.00 | 22.10 |
| Zinc, East St. Louis..... | 4.50 | 4.50 | 4.75 | 3.15 |
| Zinc, New York..... | 4.85 | 4.85 | 5.10 | 3.52 |
| Lead, St. Louis..... | 4.15 | 4.15 | 4.15 | 2.90 |
| Lead, New York..... | 4.30 | 4.30 | 4.30 | 3.00 |
| Antimony (Asiatic), N. Y.... | 7.25 | 7.25 | 6.70 | 5.75 |

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

▲ ▲ ▲ The Iron Age Composite Prices ▲ ▲ ▲

Finished Steel

| | Nov. 28, 1933 | 2.015c. a Lb. |
|--|-------------------|------------------|
| One week ago | 2.015c. | |
| One month ago | 2.023c. | |
| One year ago | 1.948c. | |
| Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output. | | |
| | High | Low |
| 1933..... | 2.036c., Oct. 3; | 1.867c., Apr. 18 |
| 1932..... | 1.977c., Oct. 4; | 1.926c., Feb. 2 |
| 1931..... | 2.037c., Jan. 13; | 1.945c., Dec. 29 |
| 1930..... | 2.273c., Jan. 7; | 2.018c., Dec. 9 |
| 1929..... | 2.317c., April 2; | 2.273c., Oct. 29 |
| 1928..... | 2.286c., Dec. 11; | 2.217c., July 17 |
| 1927..... | 2.402c., Jan. 4; | 2.212c., Nov. 1 |

Pig Iron

| | Nov. 28, 1933 | \$16.61 a Gross Ton |
|--|-------------------|---------------------|
| One week ago | 16.61 | |
| One month ago | 16.61 | |
| One year ago | 13.59 | |
| Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham. | | |
| | High | Low |
| 1933..... | \$16.71, Aug. 29; | \$13.56, Jan. 3 |
| 1932..... | 14.81, Jan. 6; | 13.56, Dec. 6 |
| 1931..... | 15.90, Jan. 6; | 14.79, Dec. 15 |
| 1930..... | 18.21, Jan. 7; | 15.90, Dec. 16 |
| 1929..... | 18.71, May 14; | 18.21, Dec. 17 |
| 1928..... | 18.59, Nov. 27; | 17.04, July 24 |
| 1927..... | 19.71, Jan. 4; | 17.54, Nov. 1 |

Steel Scrap

| | Nov. 28, 1933 | \$9.92 a Gross Ton |
|--|------------------|--------------------|
| One week ago | 9.83 | |
| One month ago | 10.17 | |
| One year ago | 7.37 | |
| Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago. | | |
| | High | Low |
| 1933..... | \$12.25, Aug. 8; | \$6.75, Jan. 3 |
| 1932..... | 8.50, Jan. 12; | 6.42, July 5 |
| 1931..... | 11.33, Jan. 6; | 8.50, Dec. 29 |
| 1930..... | 15.00, Feb. 18; | 11.25, Dec. 9 |
| 1929..... | 17.58, Jan. 29; | 14.08, Dec. 3 |
| 1928..... | 16.50, Dec. 31; | 12.08, July 2 |
| 1927..... | 15.25, Jan. 11; | 13.08, Nov. 12 |

Slight Improvement in Releases at Pittsburgh



**Ingot Output Holds at 21 Per Cent—
Operations Increase in Wheeling Dis-
trict and Valleys—Scrap More Active**

PITTSBURGH, Nov. 28. — With many advances in first quarter prices on steel products to become effective on Dec. 1, producers in this district expect fairly heavy specifications to be driven in in anticipation of the higher prices. The advances will affect wire rods, wire products, track bolts, lap weld and seamless steel boiler tubes, tin plate, long ternes and cold-finished bars.

With specifications and new buying at the end of November reflecting slight improvement, forecasts of steel activity in December are rather optimistic. Whether or not current hopes will be realized depends largely upon the celerity of Government handling of final rail negotiations, reappearance of major buying by the automotive industry, and uninterrupted flow of releases against the PWA program.

Some doubt exists, however, that those three consuming factors will be timely enough to stem the usual seasonal recession next month. It is considered conjectural whether loans of the carriers can be finally arranged before January; large automobile manufacturers are believed to be amply covered for their steel needs for at least six to eight weeks, and releases of additional public works projects will probably benefit labor to a greater extent than they will aid mills.

In the Pittsburgh district output at the beginning of this week was holding unchanged from last week at 21 per cent. Operations in the Valleys and nearby northern Ohio mills will probably average 35 per cent for the week, while production in the Wheeling district is higher at 50 per cent of capacity.

The scrap market after a prolonged period of inactivity shows signs of life, with prices generally steady. Pig iron continues to be extremely dull.

Pig Iron

Sellers will open books on Dec. 1 for first quarter tonnage, with current prices to apply. In the absence of any increase in quotations, first quarter contracting is not expected to gain headway until after the turn of the year. Large consumers, who had been expected to enter the market be-

fore the end of fourth quarter, continue to withhold buying. The wide spread between pig iron and cast scrap prices continues to depress consumption of pig iron. Consumers who are usually dependent upon merchant stacks for their pig iron needs have, in most cases, boosted the percentage of scrap charges in order to effect operating economies.

Semi-Finished Steel

Wire rods for first quarter will be advanced \$1 to \$36 a gross ton, Pittsburgh or Cleveland. Quotations on sheet bars, slabs and billets will remain unchanged for that delivery. Prices on forging billets and skelp will likewise be reaffirmed. Non-integrated mills are still hesitant about stating their requirements, and movement of all semi-finished grades is somewhat light.

Warehouse Business

Advanced prices on wire products will probably be reflected soon in warehouse quotations. Deliveries out of warehouse stocks in this district are still restricted, though orders for November have matched those for October.

Plates and Shapes

The current price of 1.70c., Pittsburgh, will be reaffirmed for delivery in the first quarter. The local district is devoid of any significant new business at the moment. Fresh barge work is at a minimum, and tank and railroad repair work offer little impetus to general demand. Projected car building, however, sustains hopes for substantial demand within the reasonably near future.

Structural steel demand continues to originate chiefly in PWA projects, with State highway bridges still prominent. Several proposed educational buildings contributed to the list of new structural work that appeared in the past week. Awards for the week, however, were in small volume, with 3200 tons for Boulder Dam trash racks the only sizable tonnage reported.

Rails and Track Accessories

Formal inquiries for steel rails received in this district have been of no major importance thus far. The lack of specific inquiry, however, may

be laid to the fact that the carriers, in figuring their requirements for submission to the Federal coordinator for approval of loans, are posted on the present rail price and consider issuance of formal inquiries unnecessary in their preliminary figuring. Inquiries for track accessories, however, continue to appear in good volume. The Delaware, Lackawanna & Western Railroad, which contemplates a direct purchase of rails, is inquiring for about 5000 tons of track accessories. A resolution has been approved by governors of the steel code whereby producers are now permitted to make contracts prior to March 1, for shipment prior to July 1, on steel rails, splice bars, spikes and tie plates. Whether or not this ruling will influence the prospective purchase by the Pennsylvania Railroad is not yet determined. Track bolts have been advanced \$3 a ton to \$3.55 per 100 lb., basing point, effective Dec. 1.

Wire Products

On Dec. 4, prices will be advanced for application to spot and first quarter business. The new base prices at Pittsburgh and Cleveland will be as follows: bright wire, 2.20c., and spring wire, 3.20c., a lb., to the manufacturing trade; standard wire nails and smooth coated nails, \$2.35, and galvanized nails, \$3.85, base per keg; smooth annealed wire, \$2.35, smooth galvanized wire, \$2.80, polished staples, \$3.05, galvanized staples, \$3.30, and galvanized barbed wire, \$2.85, base per 100 lb. Woven wire fence, base column, will be advanced to \$60. Revisions in extras covering quality grades of wire will also become effective. Specifications against fourth quarter contracts have already bulged as a result of the higher prices for the coming quarter.

Tubular Products

On Dec. 1, discounts reflecting an average advance of \$5.50 a ton on standard commercial seamless boiler tubes will be lowered on a number of sizes. Changes in the cold-drawn group will be as follows: 1 in., 1 1/4 to 1 1/2 and 1 1/2 in., 68 per cent off; 3 in., 38 per cent; 3 1/2 in. to 3 1/2 in., 41 per cent off; 4 in., 43 per cent. In the hot-rolled group the changes will be: 3 in., 44 per cent; 3 1/2 to 3 1/2 in., 47 per cent; and 4 in., 49 per cent. These prospective price changes have not thus far stimulated specifying or new buying, but, with many fourth quarter contracts stipulating delivery by Dec. 15, producers expect an early spurt in specifications. General inquiry for tubular products is improved.

Sheets

Some producers have reaffirmed current sheet prices for first quarter delivery. Revised extras, which will become effective shortly, represent minor changes and clarification of previously muddled set-ups. Although a few sizable orders have been received recently from the automotive

industry, demand from that source cannot be characterized as improved, and is not expected to reflect significant expansion until well after the first of the year. A few miscellaneous consuming lines are holding up rather well for this season, but other tonnage requirements of sheets are not currently important. Sheet mill operations are slightly above 30 per cent of capacity.

Bars

Soft steel bars will be reaffirmed at 1.75c., Pittsburgh, for first quarter delivery. Alloy bars will be unchanged at 2.45c., Pittsburgh. On merchant bars, the first of the year will mark an actual advance of \$3 a ton, inasmuch as most large consumers are covered for fourth quarter at the old price of 1.60c. No actual improvement in demand can be noticed, but interest among consumers, though in a tentative stage, is broader.

The reinforcing bar market is sustained by a regular flow of Federal work. Army cantonnments, some of which are projected for the South, are beginning to mature, and producers expect to derive some benefit from this source shortly. State road and bridge work practically complete the list of pending work involving reinforcing steel. Although an advance of \$1 a ton on reinforcing steel bars for first quarter is under consideration, no definite assurance is in evidence that such an advance will be realized. Some changes in quantity and quality extras for first quarter will be effected.

Strip Steel

Current Pittsburgh bases of 1.75c. for hot-rolled and 2.40c. for cold-rolled strip will be continued for first quarter. Sellers will start to take bookings for that period on Dec. 1. A slight improvement in specifications and orders is reported, although it is difficult to trace the betterment to any particular source. Interest from the automotive industry, while momentarily restricted, is expected to pick up within a few weeks.

Tin Plate

Next year's price, per base box, has been announced at \$5.25, Pittsburgh, and \$5.35, Gary, to become effective on Dec. 1. With few exceptions, tin plate mills will be pushed to fulfill present commitments before the close of the year, and very little new tonnage is therefore being booked. Operations at some units are on a reduced scale, and rolling schedules for the group average about 85 to 90 per cent of capacity.

Cold-Finished Steel Bars

Effective on all shipments on and after Jan. 1, prices on cold-finished bars will be advanced \$3 a ton. The Pittsburgh base will be 2.10c.; Chicago, Gary and Cleveland, 2.15c.; Buffalo, 2.20c.; Detroit, 2.30c., in carloads, and 2.38½c. in less carload

lots; and eastern Michigan, 2.35c. The new Buffalo base reflects an advance of \$4 a ton, instead of \$3, to adjust the differential to that destination in line with hot-rolled bar base prices. Ground shafting has also been advanced \$3 a ton. The new prices will undoubtedly drive in a fair amount of business before the close of the year, but despite the fact that the advances had long been expected, consumers continue to remain aloof.

Coke and Coal

Freezing weather has prompted many consumers to check up on their fuel stocks. The recent improvement in demand for foundry and furnace coke is holding, though aggregate movement still is far below normal. Bituminous coal production continues to increase, and, with offerings in abundance, consumers are timing purchases according to imperative needs. Recent minimum prices established under coke and coal codes continue to rule.

Scrap

At least two mills in this district covered for round tonnages of scrap

in the past week. One consumer is reported to have purchased approximately 2000 tons of No. 1 heavy melting steel. This material represented Pennsylvania Railroad scrap. A small part of it was a distress lot, which was purchased at \$11, with the major share going at \$11.50, delivered. A consumer in the Wheeling district is reported to have purchased No. 1 steel at around \$11. Dealers in the Pittsburgh district are actively buying No. 1 steel for delivery at a nearby point, indicating that a further consumer purchase has been made. Dealer offerings for that grade range from \$10.50 to \$11, but at the lower figure tonnage is apparently not plentiful. The general market for No. 1 steel appears to be firm, and the current quotational range is holding at \$11.25 to \$11.75. Heavy breakable cast is soft and slightly lower at \$10.25 to \$10.75. Pennsylvania Railroad scrap offerings this month total 18,404 tons, of which 3300 tons is No. 1 heavy melting steel, and 3400 tons is No. 3 and No. 4 rail steel. The Baltimore & Ohio list, offering 8660 tons, includes 1800 tons of No. 1 steel and 2200 tons of No. 1 rail steel.

Valley Demand Shows Promise of Early Recovery as Output Holds at 32 Per Cent

YOUNGSTOWN, Nov. 28.—General demand for finished steel products is not expected to reflect the usually sharp contraction that marks the closing weeks of the year, according to Valley steel producers. In fact, if the present trend toward heavier daily bookings and specifications is maintained, accelerated rolling schedules during December may not be unlikely. Ingot output for the current week will probably hold at 32 per cent.

The only certain downward revision in December operations will occur at tin plate mills in this district. Most of these units will have completed specifications against 1933 contracts, and, while hot rolling against next year's business will start on the first of the month, production will be on a notably restricted basis as compared with output in recent months. Bookings against next year's tin plate requirements will start on Dec. 1, when the new price of \$5.25, Pittsburgh, will become effective.

Although current calls for sheets from the motor car industry are not particularly improved, a marked pick-up from that source is expected next month. Miscellaneous demand for sheet steel is apparently already resisting seasonal tendencies and reflects short inventory positions of most small consumers. Container manufacturers continue to be an important factor in the sheet market.

Pipe mills are managing to maintain recent schedules. Orders for oil country goods continue to appear in fairly satisfactory volume, and demand from the jobbing trade for standard pipe is encouraging. An inquiry from the Soviet States for approximately 15,000 to 20,000 tons of oil country goods is considered by local executives as offering definite promise of purchases within the near future. A recent order for 2600 tons of electric welded line pipe, placed with the Republic Steel Corp., will probably be furnished largely from stock.

Valley pig iron producers will open books on Dec. 1 for first quarter tonnage on the bases of present quotations of \$17 for basic and \$18 for Bessemer, at Youngstown.

With the exception of a recent sale of around 3000 tons of No. 1 heavy melting steel and bundles, the scrap market has remained lethargic. Quotations on No. 1 steel reflect a wide range. A small part of the recent sale represented distress tonnage of No. 1 steel, which went at \$11 to \$11.25, and of bundles, which sold at \$10.75 to \$11. Other offerings of No. 1 steel in this district range up to \$12, but it is doubtful at the moment that any buying will be attracted at this price.

Steel mill equipment makers are enjoying a stir of inquiry, as are manufacturers of ingot molds.

Initial Rail Orders Placed In Chicago District



**Two Western Roads Buy 31,500 Tons—
Ingot Output Recedes Slightly — Pig
Iron Prices Reaffirmed for First Quarter**

CHICAGO, Nov. 28.—Price changes for material to be delivered in the first quarter are now well established and changes are fewer than consumers had expected. Wire and wire products, wire rods and track bolts are among the products on which prices are being marked up. Most quotations on heavy tonnage products are being carried forward, producers being more anxious to build up tonnage than to raise the price structure.

Demand for steel mill products has improved in some directions but is off slightly in aggregate volume, as is shown by ingot output, which has receded a trifle to a range from 26 to 27 per cent of capacity. Rail programs continue to drag. Miscellaneous users of bars are taking larger quantities, but the plate market is duller. Public works are making a better showing, but here again large undertakings are maturing slowly and it will be a few weeks before they will have telling effect on mill schedules.

The rail program has brought out orders for 31,500 tons from two Western railroads, and more tonnage is expected at an early date from those railroads which do not need to borrow. The matter of putting up satisfactory collateral is delaying action among those railroads which require Government loans to finance their rail purchases. Much preliminary work has been done on the plan to have railroads enter the equipment market in a large way.

Pig Iron

Quotations on Northern foundry iron remain unchanged. The attitude taken by sellers is that tonnage is more desirable than higher prices at this time, notwithstanding that margins of profit are near or at the vanishing point. Shipments continue at a substantial rate. Sales are confined to a few spot cars, but purchases should mount sharply Dec. 1 with the opening of the new contracting period.

Rails and Track Supplies

Two Western railroads, the Burlington and the Northern Pacific, have placed orders for rails amounting to 31,500 tons. The Burlington ordered 13,500 tons from the Illinois Steel Co., 6500 tons from Inland Steel Co. and

5000 tons from the Colorado mill. The Northern Pacific's 6500 tons of rails and several thousand tons of track supplies were divided among the three above-mentioned producers. Track bolts to steam railroads have been advanced \$3 a ton to \$3.55 a 100 lb. for immediate delivery, prices having been filed earlier in the month. In general, rail programs are moving much slower than had been expected by the trade. The matter of collateral to be advanced by the railroads wishing to borrow is one stumbling block. No gain in production is noted at local mills.

Reinforcing Bars

Awards are somewhat heavier and inquiries for public work promise more work to local shops. Government funds are now beginning to pour into the immediate Chicago area. The Sanitary District will soon start and complete old contracts and start new work which may take up to 6000 tons of reinforcing bars. The State of Illinois, pressed on its Government-aid obligations, is opening bids on road and bridge work at intervals about 10 days apart. Bars for the Canton, Mo., dam have been placed and other similar tonnages are pending.

Plates

Activity in this market is confined to several small brewery awards in Chicago and contracts for dams across the Mississippi River. Also, about 600 tons of material, mostly plates, will be used for cranes that are to go to Boulder Dam. Very little of the incoming tonnage is from private sources.

Sheets

As matters now stand, it appears certain that all sheet mill products with the exception of tin mill black plates and long ternes will be carried forward into the first quarter at current quotations. Black plate has been advanced \$3 a ton, bringing the Gary price to 2.75c. a lb. Most sheet mill products are in light demand and backlogs are small. Deliveries are on the basis of the time required to manufacture the product wanted. From the producers' viewpoint the one bright spot for December is the expectation that specifications will increase when consumers use up the last

of old contract material bought at \$2 to \$3 a ton below current quotations.

Wire Products

Prices for first quarter have been advanced all along the line. Wire rods have been marked up \$1 a ton, wire \$2 a ton and nails, barbed wire and woven wire fencing \$5 a ton. Tests of these prices will be awaited with interest. In the first place, code prices have not been tested on any kind of a scale except within the last few weeks. Further, producers admit that the summer output was well in excess of actual requirements and much of that tonnage is still available for manufacturing purposes. Sellers are disposed to expect that first quarter contracts will be small and not speculative in character. Shipments are creeping upward very slowly.

Bars

Most producers of bar mill products report that demand is broadening both as to classification of products and as to the types of consumers. This change, of necessity, is bringing with it an upward swing in shipments. Some orders have been received from farm implement manufacturers and prospects are favorable for additional business from this source. There is little change in the automobile set-up except that builders of equipment for automobile plants are taking more steel.

Structural Material

A dam across the Mississippi River at Alton, Ill., calls for 4500 tons of steel. This inquiry and others out for figures this week total 6500 tons. Fresh awards, also including a dam across the Mississippi River, total only 3200 tons. The State of Illinois will use 400 tons for a freight and package terminal to be built at the Chicago end of the Illinois waterway.

Cast Iron Pipe

Prices have been marked up \$1 a ton, bringing the 6-in. and larger diameters to \$44 to \$45 a ton, delivered Chicago. The Kenosha, Wis., job, calling for 1300 tons, has been postponed on account of the death of the city engineer. Early estimates place the value of the pipe to be ordered for the Sanitary District, Chicago, at over \$200,000. Small pick-up orders are more numerous than is usual at this time of year.

Scrap

Underlying strength is developing in this market and dealers are raising their asking prices. Their ideas as to prices for heavy melting steel have risen to \$8.75. Specialties that are taken by railroad equipment shops are more active and new sales are at higher prices. From the dealers' point of view, consumers are not only in need of some grades of scrap, but they may soon be forced into the market as protection against advancing prices.

Prospects for Rail Buying Beclouded at New York



**Restrictions on Government Loans Imperil
Rail Buying Program — Late Effective
Date on Wire Prices Opens Way for
Contracting at Old Figures**

NEW YORK, Nov. 28.—The rail buying program, which was suggested and formulated by the Government, has now struck a snag in conditions imposed by the Government on applicants for loans. Among these are demands for collateral which are regarded as excessive by the railroads. Roads in increasing number are deciding to forego purchases with Federal aid. Some of these lines will purchase rails with their own funds, while others are undecided as to whether they will place any orders. As a consequence rail buying is not developing as rapidly as had been expected. The Louisville & Nashville has bought 17,500 tons of rails with its own funds, and on Dec. 4 the Delaware, Lackawanna & Western will take figures on 12,000 tons of rails and 3600 tons of track supplies, to be financed by itself.

The Taylor-Fichter Steel Construction Co., New York, has been awarded the towers for the Triboro bridge, this city, requiring 12,000 tons, mainly plates. The fabrication of the plate work is understood to have been sublet to a locomotive company. Work on the Thirty-eighth Street to Forty-sixth Street section of the West Side elevated highway in New York, contract for which was recently awarded, is being held up because of a hitch in Government financing.

Prices of plates, shapes and bars have been reaffirmed for first quarter. The same thing is true of sheets except long ternes, which have been advanced \$7 a ton to 3.25c. a lb., Pittsburgh. Tin mill black plate has been raised \$3 a ton from 2.50c. to 2.65c. a lb., Pittsburgh. Terne plate has been advanced in varying amounts ranging from \$1 to \$2.20 per package. The new prices, f.o.b. Pittsburgh, per 20 x 28-in. package, are as follows:

| | |
|-------------------------|---------|
| 8-lb. coating I.C..... | \$10.00 |
| 15-lb. coating I.C..... | 12.00 |
| 20-lb. coating I.C..... | 13.00 |
| 25-lb. coating I.C..... | 14.00 |
| 30-lb. coating I.C..... | 15.25 |
| 40-lb. coating I.C..... | 17.50 |

Prices on wire products have been advanced, effective Dec. 4, as follows: \$1 a ton on wire rods to \$36 a ton, Pittsburgh or Cleveland; \$37, Chicago or Youngstown; and \$39, Birmingham; \$2 a ton on plain wire to 2.20c. a lb., Pittsburgh or Cleveland; and \$5 a ton on wire nails (and kindred

products) to \$2.35 per keg, Pittsburgh or Cleveland. The fact that the prices do not go into effect until Dec. 4 raises the question whether producers will accept first quarter contracts at the old prices during the first three days of December.

Pig Iron

The filing of new prices has clarified the first quarter position, but sellers in this district continue to encounter wide-spread consumer disinterest. Open market inquiry is negligible, and new commitments are limited to prompt carlots. Bookings during the seven-day period aggregated 2500 tons, against 3500 tons in the preceding week and 2100 tons two weeks ago. The end of the year is usually characterized by dull buying, and the inactivity is currently intensified as melters draw fully on old contracts to escape cancellation. Foundries are engaged 25 to 30 per cent of capacity, and if melt receives no impetus, it is expected that consumer stocks, as of Jan. 1, will generally suffice for a considerable period.

Reinforcing Steel

There is a moderate flow of material into small jobs in this district, but large tonnages are few in number. Current quotations are firm at 1.80c. a lb., billet stock lengths, and 1.75c., rail cut lengths, Pittsburgh base, and most distributors expect prices on both billet and rail steel reinforcing bars to be reaffirmed for first quarter delivery. Awards during the past week were limited to small mesh tonnages in New York and New Jersey. Bids are in on 430 tons of bars for a sea wall on Ellis Island, and Connecticut will announce additional lettings within the next fortnight. Announcement of the steel requirements for Philadelphia and New York housing developments and the West Side elevated highway is delayed until financing is arranged by the Government.

Scrap

The rally of the dollar in terms of gold is attracting new foreign commitments, and the slow upturn of steel production presages some revival of domestic interest. Loadings of heavy melting grades for Japanese

and Italian interests continue in large volume, but shipments to Poland have fallen off somewhat. Moderate loadings of specialties are being made for German consumption. Brokers' buying prices on all grades are unchanged and steady, and No. 1 and No. 2 heavy melting steel is moving freely at \$7.50 and \$6.50 a ton respectively. Cast grades are moving in sizable volume as a result of Bethlehem's increased activity and moderate purchasing by brokers to cover contracts. Blast furnace and rolling mill grades are quiet, and quotations are untested.

Cast Pipe and Wire Prices Advanced at Birmingham

BIRMINGHAM, Nov. 28.—The number of active blast furnaces in this district was raised to seven last Saturday when the Tennessee Coal, Iron & Railroad Co. blew in Ensley No. 5 on foundry iron, preparatory to producing ferromanganese, which will start about Dec. 11. Two other Ensley furnaces, No. 3 and No. 6, have been banked since Oct. 10 and are awaiting the accumulation of sufficient rail tonnage to justify a resumption of iron and steel production at the Ensley works.

The other six active furnaces are Fairfield No. 6 of the Tennessee company; No. 1 and No. 2 of Sloss-Sheffield Steel & Iron Co.; No. 1 and No. 2 of Republic Steel Corp., and No. 1 of the Woodward Iron Co.

At this time there is no intimation as to the price of pig iron for the next quarter. The current price is still \$13.50, with only a small amount of new tonnage. Shipments continue at a steady rate and the combined November total of the three merchant producers will be slightly larger than the October total.

Cast Iron Pipe

Pressure pipe prices were advanced \$1 a ton last week, and the new base prices are \$36 a ton for 200 tons and over; \$37 a ton for less than 200 tons. November pipe business has been just about the same as that of October.

Scrap

The scrap market is dull and listless, with only occasional buying and limited specifications against contracts. One large consumer has resumed taking scrap against contracts after a stoppage of about two months, but this movement is almost entirely for stocking.

Steel

Prices of wire products have been advanced, in line with the increases by other districts. The new quotations are effective Dec. 1 for first quarter business. Wire nails, staples, barb wire and field fencing are up \$5 a ton; wire rods, \$1; spring wire,

manufacturers' wire and galvanized fence wire, \$2; bale ties, \$7. No increases have been made in bars, plates, shapes and sheets.

These prospective increases are expected to stimulate December buying and shipments at a time when they would otherwise lag. Current business is still light. Structural tonnage is expected to pick up in view of jobs in prospect or recently placed, but not much of it has come through to the mills as yet.

Railroad inquiries have been numerous, but it is stated that little business has yet been placed. The Ensley rail mill will likely start up the week of Dec. 11 for a short run, according to present plans.

Six open-hearths were worked last week and six are listed for this week. There has been no change in the total for four weeks.

Government Awards Feature Coast Market

SAN FRANCISCO, Nov. 27.—Heavy tonnages are called for in several contracts let by the Government during the week. At Pearl Harbor, T. H., the Hawaiian Dredging Co. took the general contract for a pier and quay walls, which will require 6500 tons of reinforcing bars and 250 tons of structural steel. The extension of the foundry building at the Pearl Harbor Navy Yard was placed with Ralph E. Wooley and the Star Iron & Steel Co. was awarded 2500 tons of structural steel for cranes.

Concrete Engineering Co. took 1000 tons of reinforcing bars for three hangars at Hamilton Field, Cal. For the same project 2700 tons of structural steel is still pending. Great Lakes Construction Co. was awarded the general contract for the Federal building at San Francisco.

For Boulder Dam the Bureau of Reclamation has awarded 3100 tons of structural steel for trash racks to Ingalls Iron Works Co. and 1500 tons of shapes and plates for drum gates to Consolidated Steel Corp.

Steel bookings were heavier during the week, with aggregate awards of 7056 tons of structural steel, 2033 tons of reinforcing bars and 1340 tons of plates. Among the new projects listed were a greater number of State highway jobs. New inquiries for 1735 tons of structural steel, 1383 tons of reinforcing steel and 5841 tons of cast iron pipe were reported.

Carnegie Steel Co., Pittsburgh, has revised its booklet entitled "Carnegie Steel Sheet Piling," and has distributed corrected pages representing modifications in its steel sheet piling series.

Production Holds at 42 Per Cent in Cleveland Area



Automotive Outlook Promising — Most Prices Announced for First Quarter — Lake Ore Movement for Year Totals 21,600,000 Tons

CLEVELAND, Nov. 28.—The volume of business in finished steel showed a slight gain during the week. While orders are somewhat more numerous than recently, they are still confined to small lots. The improvement is probably due at least in part to the desire of contract customers to enter orders against their November quotas before the end of the month. While some consumers are taking all the steel covered by their monthly quotas, others have fallen far behind in specifications against the tonnage covered by their fourth quarter contracts. The volume of business in November will show little change as compared with October.

Ingot output in the Cleveland-Lorain territories is unchanged this week at 42 per cent of capacity, although this may not be maintained through the week. Some renewal of buying is expected by the automotive industry early in December, although motor car manufacturers still have large stocks. Demand from this source at present is very slack. Steel producers find considerable encouragement in the outlook in the automotive industry through the fact that dealers' stocks of motor cars are very low and good output will be required for some time to stock up dealers with new models.

With additional price advances announced, most prices have been named for the first quarter. Present prices have been reaffirmed on sheets and hot and cold-rolled strip. Advances include \$1 a ton on wire rods, \$2 on manufacturers' wire, \$5 on wire nails and \$7 on long ternes. Some important revisions are being made in extras on wire products. The present base on alloy steel bars probably will not be changed. Advances on bolts and nuts are scheduled. An advance is looked for on cold-finished steel bars, the price not having yet been named.

The Lake shipping season is closing this week, with an ore movement by water of slightly over 21,600,000 tons.

Pig Iron

Some of the leading shippers have set Dec. 15 as the deadline date for taking specifications against pre-code contracts. Shipments continue to improve and some of the increase is attributed to orders against these old

contracts. November shipments are about 20 per cent ahead of October. Motor car foundries have considerable tonnage due on these contracts, but so far there has been no pick-up in orders from this source. It is expected that most of the iron due against the old low-priced contracts will be taken out in December, even if consumers have to carry some in stock for later requirements. Demand for small lots for prompt shipment has improved. Foundries in the railroad field are figuring on car work requiring sizable lots. Lake furnaces will open their books Dec. 1 for the first quarter at present prices.

Bolts and Nuts

With an increase in the cost of steel used in their products amounting to 20 per cent, according to their estimates, makers expect to announce in a few days a price advance for the first quarter. In addition to the \$2-a-ton advance on manufacturers' wire and \$1 a ton on wire rods, new extras have been named for these grades having cold-heading qualities. Makers will also pay \$3 a ton above their present contract price for steel bars.

Strip Steel

New demand is very light and little improvement is expected until the automotive industry begins to place orders for the first quarter. While some of the leading automobile parts plants are fairly busy on accessories for new models, they have enough strip in stock to last them through December.

Bars, Plates and Shapes

With the placing of public work, orders for structural shapes in small lots show a moderate improvement. Ohio awards include a State building and a highway bridge, requiring 318 tons. New inquiries are out for bridge work in western New York, taking 900 tons. Orders for plates from boiler shops have gained. Demand for merchant bars and reinforcing bars continues dull.

Sheets

Consumers in the automotive field are beginning to show a little interest in their first quarter requirements now that prices are named, and some

round-lot business is expected from that source during the early part of December, although the automobile plants still have large stocks. Some small-lot fill-in orders continue to come from motor car manufacturers. Inquiry from Ohio stamping plants doing automotive work shows a slight increase. Demand from other sources is slack.

Scrap

With large stocks in most of their yards, consumers are showing no interest in scrap and little activity is expected until around the first of the year. The New York Central Railroad has issued a list of 5000 tons of miscellaneous grades for which it will receive bids Dec. 6.

Demand Still Sagging At Cincinnati

CINCINNATI, Nov. 28.—Extreme sluggishness characterizes the local pig iron market. Business, the past month, has dwindled steadily and bookings for the week totaled only about 200 tons. Melters are apathetic toward new purchases largely because of their present substantial inventories. Northern furnaces have reaffirmed present quotations for first quarter business, but Southern representatives are still uncertain as to Birmingham prices in the new year. Shipments too have eased during the month. Foundry business is unchanged. Fear that the civil works program would attract large numbers of skilled workman into Governmental work at steady time in preference to sporadic jobs in foundries caused a committee of local foundrymen to discuss the situation with the district works administrator the past week. Some method of assuring them that labor would be released in the event of a revival in business was sought, but the feeling developed that perhaps an opinion from Washington might be necessary.

Steel

The preparation for automobile and refrigerator model changes is depressing the district sheet market. New bookings, the past week, hovered around 20 per cent of mill output. Rolling schedules are on a parity with demand, although the leading interest indicates that operations of its units are being staggered. Jobbers continue to absorb a representative proportion of output, but other sheet consumers are not eager for material.

Scrap

Better demand for scrap in other districts is reflected in a better undertone in the local market. Prices are steady. Speculative purchases are nil, however, dealers buying only to cover old contracts and occasional spot orders.

Large River Job Up For Bids in St. Louis District

ST. LOUIS, Nov. 28.—The United States Engineer's office at St. Louis will open bids Dec. 19 for twin locks in the Mississippi River at Alton, Ill., 23 miles above St. Louis, requiring 3145 tons of sheet steel piling, 2120 tons of structural steel, and 1500 tons of reinforcing bars. The Missouri Pacific Railway has awarded 400 tons for a bridge at Ria Vista, Ark., to the American Bridge Co.

The notice of the advances of from \$1 to \$5 a ton on wire products, effective Dec. 1, for the first quarter tended to stimulate some buying. Prices on plates, shapes and bars are unchanged for next quarter.

The American Steel Foundries have bought a round tonnage of rails and specialties, being their first purchase of scrap in the last 18 months. The transaction resulted in advances on these items, as follows: miscellaneous standard-section rails, 25c. a ton; steel rails, less than 3 ft., 50c., and railroad springs and rails for rolling, \$1. Dealers report a scarcity of material and no distress cars are being offered. Stocks in hands of mills, it is said, are not excessive, and with any pick up in business, further buying is expected.

An increase of shipments of pig iron is reported by makers. Buying has been delayed pending the issuance of first quarter prices on Dec. 1, but melters have been asking makers to notify them promptly when prices have been set. A heavy buying movement is expected for first quarter shipment, because of the small carry-over. One maker estimates that 80 per cent of the buyers will require first quarter iron.

Steel Output Higher At Buffalo

BUFFALO, Nov. 28.—Bethlehem has added a furnace at its Lackawanna plant, making six open-hearths active, and will probably continue operations at that rate until Thursday of this week at least. Republic Steel Corp. is still operating five furnaces, and Wickwire-Spencer, two. The Seneca division of Bethlehem has reduced operations to 25 to 30 per cent. Detroit labor troubles are blamed for the reduction of schedules at Seneca. Bethlehem recently rolled a small rail order of about 1000 tons. Nine Erie County bridges will require 800 tons of fabricated structural.

District producers of pig iron will open their books Dec. 1 for first quarter at the same prices that have prevailed during the fourth quarter. Local interests feel that the advance of \$1 a ton at eastern Pennsylvania basing points places Buffalo in a

stronger position for business a little later on, especially on inquiries coming from northern New England points.

Scrap dealers, who had almost reconciled themselves to an inactive period throughout the remainder of the last quarter, are now of the opinion that buying will develop before Jan. 1. Prices are unchanged.

Late December Pig Iron Sold in Boston

BOSTON, Nov. 28.—Some melters the past week bought pig iron for late December delivery to evade paying 50c. a ton more for first quarter delivery, and furnace representatives anticipate further bookings of this sort within the next week or ten days. The pig iron market, however, is rather inactive, and most of the large consumers have sufficient stock on hand to carry through the first quarter provided there is no upturn in their bookings. The general outlook in the New England foundry trade is probably as uncertain as at any time during the depression.

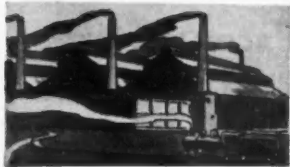
Scrap brokers have virtually no shipping instructions for eastern Pennsylvania or Pittsburgh district consumption, and buying by the American Steel & Wire Co., Worcester, Mass., has been restricted largely because of reduced operations. The Worcester concern, however, still has inquiries out for No. 1 steel, No. 2 steel and bundled skeleton, but owners of such scrap are inclined to hold for higher prices than have been offered.

Much publicity regarding Government construction programs finds its way into print, but little work of that sort has materialized in New England. Cast iron pipe sales are more active. Few large individual orders have been involved, but the aggregate tonnage is fair.

Detroit Scrap Market Quiet

DETROIT, Nov. 28.—The situation in the local scrap market is virtually unchanged from a week ago with buyers uninterested in making new commitments at the moment. An improvement is not looked for until after Jan. 1. Although considerable material will be coming on to the market in the next 30 days because of increased automotive production and there will be no immediate consumer outlet for it, prices are not expected to sink below current levels. The local steel plant, still running three open-hearth furnaces, is continuing to take in scrap on old contracts and has a comfortable volume of material in its yards.

Steel Making Rate Higher In Eastern Pennsylvania



**Pennsylvania Railroad's Awards Expected
This Week — Pig Iron More Active—
Finished Steel Price Advances Drive in
Little December Business**

PHILADELPHIA, Nov. 28.—Although finished steel tonnage coming to eastern Pennsylvania mills in November was the lightest since March, producers feel that December will not bring the usual sharp seasonal decline. Steel ingot production in the district has risen a point this week and is estimated at 18 per cent of capacity after remaining at 17 per cent for the last fortnight. Finishing mill schedules are still irregular, but stocks of raw steel built up during October are being depleted and the industry is again in a position where open-hearth activity cannot be suspended entirely for any length of time.

Interest centers in the awards of 159,000 tons of rails, track accessories and miscellaneous steel products on which the Pennsylvania Railroad took bids last week. It is generally believed that the 100,000 tons of rails involved will be allocated among the usual sources of supply, but there were many bidders on the track accessories and bars, plates, shapes and sheets in the inquiry. Prices were generally on the same basis, under the code, but in accordance with Commercial Resolution No. 29, freight allowances varied with the location of mills. Under the terms of the Clayton Act, the business must be awarded by Dec. 4, and much of the tonnage is expected to be placed this week. The Reading has issued no formal inquiry for rails and accessories, but may soon ask for bids on 5000 tons of rails.

Pig Iron

With December business still being taken at the old prices, most of the sellers in this territory have taken a fair aggregate of small miscellaneous orders in the last week. Shipments are also slightly heavier, although consumers are not yet in any hurry to take out the remaining tonnage in their old contracts which are not subject to cancellation before Dec. 31. The price advance brought no large inquiries into the market, as most users of basic iron in the district are covered well into the first quarter. The Pennsylvania Railroad is inquiring for 300 tons of foundry iron for delivery at Altoona, Pa., on which ac-

tion will be taken this week in order to take advantage of low prices.

Bars, Plates and Shapes

Bids on the bars, plates and shapes taken last week by the Pennsylvania Railroad were generally at the quoted levels of 1.70c., Pittsburgh, on plates and shapes and 1.75c., Pittsburgh, on bars, with the expected freight allowances. The Navy Department has postponed until later this week the taking of bids on the plates and sheets required for cruisers and gunboats, on which action was scheduled for last week. However, tenders were taken in Washington today on nine coast guard cutters requiring 2800 tons of plates and 900 tons of shapes. No outstanding reinforcing bar or structural shape jobs have come out in the last week and action is delayed on many projects which had been expected to come before the trade by this time. Highway lettings are being made regularly in Pennsylvania and New Jersey, but the tonnages involved are small. No price change is expected for first quarter.

Sheets

Demand continues very light, with all the common finishes of sheets adversely affected. Automobile body builders in this district are able to give no intimation of their early 1934 requirements. First quarter sheet prices have not been officially reaffirmed, but no filing of prices is necessary if there is to be no change. Tin mill black plate has been advanced \$3 a ton to 2.65c., Pittsburgh. Higher prices have also been filed on terne plate and long ternes, the latter being advanced \$7 a ton.

Warehouse Business

Although November sales have fallen under the previous month with most of the warehouses in this district, declines have not been large. Corrugated galvanized sheets are fairly active. Higher prices on boiler tubes are expected to be announced in the next week or two in keeping with the mill advance.

Imports

The following iron and steel imports were received here last week: 6800 tons of iron ore from Algeria,

400 tons of ferromanganese from Norway, 32 tons of steel bars, 18 tons of steel tubes and 2 tons of steel forgings from Sweden.

Scrap

The market is still devoid of interest on the part of consumers and brokers are devoting most of their time to purchases for export. A cargo of more than 5000 tons of heavy melting steel left a nearby port last week and another ship will arrive for loading in the near future. Machine shop turnings are weaker in the absence of mill demand and are being shipped against blast furnace orders. Old hydraulic bundles are particularly weak.

Ore Shipments for 1933 Far Ahead of Last Year

SHIPMENTS of Lake Superior ore by water were approximately 21,618,421 tons during 1933. This figure includes two or three cargoes that are being loaded at Escanaba, which are estimated at 20,000. Shipments from all other ports except Marquette were finished last week, final ore moving from Marquette early this week. The November movement with final Escanaba cargoes estimated was 779,338 tons. The 1933 movement compares with water shipments last year of 3,567,985 tons.

| Lake Ore Shipments by Water, Gross Tons | | | |
|--|----------|----------------|----------------|
| | November | Season 1933 | Season 1932 |
| Escanaba | *200,472 | *1,642,503 | 329,870 |
| Marquette | 242,715 | 2,622,584 | 314,767 |
| Ashland | 44,762 | 2,400,769 | 673,425 |
| Superior | 291,389 | 5,835,101 | 791,212 |
| Duluth | none | 5,839,523 | 1,047,997 |
| Two Harbors | none | 3,277,941 | 410,714 |
| Total | *779,338 | *21,618,421 | 3,567,985 |
| 1933 Increase | | 18,050,436 | |

*These figures include two or three late cargoes from Escanaba estimated at 20,000 tons.

| Water Shipments of Last 10 Years, Gross Tons | | | |
|---|------------|------|-------------|
| 1924 | 42,623,572 | 1929 | 65,204,600 |
| 1925 | 54,081,298 | 1930 | 46,582,982 |
| 1926 | 58,537,855 | 1931 | 23,467,786 |
| 1927 | 51,107,136 | 1932 | 3,567,985 |
| 1928 | 53,980,874 | 1933 | *21,618,421 |

Store-Door Delivery to Be Widely Adopted

WASHINGTON Nov. 28.—Railroads throughout the country east of the Mississippi River are expected to institute pick-up and delivery service in connection with the transportation of freight articles in less-than-carloads, beginning Dec. 1. This move was seen as the result of the refusal of the commission yesterday to suspend tariffs providing for this service which had been filed by the Pennsylvania, Grand Trunk and Erie Railroads.

Chicago Roads Apply for Loans to Buy 87,000 Tons of Rails and Accessories

WASHINGTON, Nov. 28.—The Chicago & North Western Railroad today applied to the Interstate Commerce Commission for approval of a loan of \$3,500,000 from the Public Works Administration for the purchase of 65,000 gross tons of steel rails and about 18,000 tons of rail fastenings, tie plates and track accessories. The rails are to be laid in the carrier's high-speed line.

The Chicago & Eastern Illinois Railroad, now in receivership, applied for approval of a PWA loan of \$251,300 for the purchase of 4000 tons of steel rails, together with the necessary track fastenings, to be used in its high-speed lines.

Both applications state that the Public Works Administration has offered to make the required loans. This is taken to be equivalent to actual approval by the Interstate Commerce Commission and the purchase of the tonnages. Each applicant proposes to purchase the rails at \$36.37½ per ton, the price agreed upon between President Roosevelt and rail makers.

The North Western offers promissory notes as collateral for the loan it has asked, while the Chicago & Eastern Illinois offers trustees' certificates up to the full amount of the loan it has asked.

The North Western says the cost for the 65,000 tons of rails it will purchase will be \$2,403,375, while the cost of the fastenings and accessories will be about \$1,058,538.50, making a total of \$3,459,913.50. Included in the total are transportation charges. The North Western will lay the rails between Chicago and Council Bluffs, Iowa, for a distance of about 260 miles; between Chicago and Milwaukee, for a distance of about fifteen miles and between Chicago and Elroy, Wis., for a distance of 89 miles.

Attached to the North Western application is a resolution adopted Sept. 13 by its Board of Directors authorizing negotiations of Government loans of \$6,000,000 to purchase steel rails and fastenings and \$1,000,000 for use in completing the elevation of tracks at Kenosha, Wis. In view of this action it is expected that formal application will later be made for a loan of the balance required.

The North Western application said that carrier's purchases of steel rails this year up to November totaled only 4812 tons, while in 1932 it purchased only 512 tons. The average quantity of rails laid during the nine-year period 1922 to 1930 was 36,121 tons.

In order to bring the average of the three-year period 1931-1933 inclusive to the average for the nine-year period, it was stated, it will be necessary to lay 83,289 tons of rails. The carrier said it has but little rail in stock.

The Chicago & Eastern Illinois proposes to replace 90-lb. rails with 1000 tons of 110-lb. and 3000 tons of 112-lb. sections.

Reinforcing Steel Awards 3650 Tons—New Projects 10,130 Tons

AWARDS

Arlington - Cambridge - Belmont, Mass., 150 tons, State road, to Northern Steel Co.

Cambridge, Mass., 100 tons, post office, to Northern Steel Co.

Herkimer County, N. Y., 200 tons, road mesh, to American Steel & Wire Co.

Peoria, Ill., 610 tons, addition to Hiram Walker Distillery, 400 tons, to Concrete Engineering Co., 210 tons, to Kalman Steel Co.

Canton, Mo., 735 tons, dam across Mississippi River, to an unnamed bidder.

Island of Kauai, T. H., 275 tons, Federal road, to Grace Brothers.

State of California, 150 tons, highway work in eight counties, to unnamed bidders.

Hamilton Field, Cal., 1000 tons, three hangars, to Concrete Engineering Co.

State of Oregon, 123 tons, highway work in five counties, to unnamed bidders.

Canal Zone, 289 tons, Specification No. 2914, to Bethlehem Steel Co.

NEW REINFORCING BAR PROJECTS

Fort Mifflin, Pa., 230 tons, magazine building for United States Army.

Northampton, Mass., 150 tons, boiler house.

Mattapan, Mass., 110 tons, three State hospital units.

Alton, Ill., 1500 tons, twin locks in Mississippi River; bids to be opened by United States District Engineer, St. Louis, Dec. 19.

Quincy, Ill., 350 tons, Government lock and dam; Joseph Meltzer Co., New York, low bidder on general contract.

Chicago Sanitary District, 6000 tons, preliminary estimate on new work to be undertaken with Government funds.

State of Illinois, 600 tons, highway bridges; bids opened Nov. 28.

Oregon, Ill., 500 tons, highway bridge.

Manteno, Ill., estimates being prepared, buildings at State hospital.

State of California, 100 tons, highway work in four counties; bids Dec. 13.

Mare Island, Cal., 200 tons, magazines; bids under advisement.

Los Angeles, 410 tons, material for Metropolitan Water District, Specification No. 18112; bids under advisement.

San Francisco, 600 tons, Federal building; Great Lakes Construction Co. general contractor.

San Diego, 100 tons, heating plant at Navy Yard; B. O. Larson, general contractor.

Los Angeles County, Cal., 100 tons mesh, conduits; bids under advisement.

Zenith, Wash., 140 tons, State highway bridge; plans completed.

Multnomah County, Ore., 108 tons, State bridge over McCarty Creek; bids Dec. 7.

State of Oregon, 111 tons, highway structures in nine counties; bids Dec. 7.

Pearl Harbor, T. H., 6500 tons, pier and quay walls; Hawaiian Dredging Co. general contractor.

Filbert Becomes Finance Committee Chairman

THE following announcement was made Tuesday by Myron C. Taylor, chairman, United States Steel Corp.: Effective Jan. 1, 1934, Myron C. Tay-



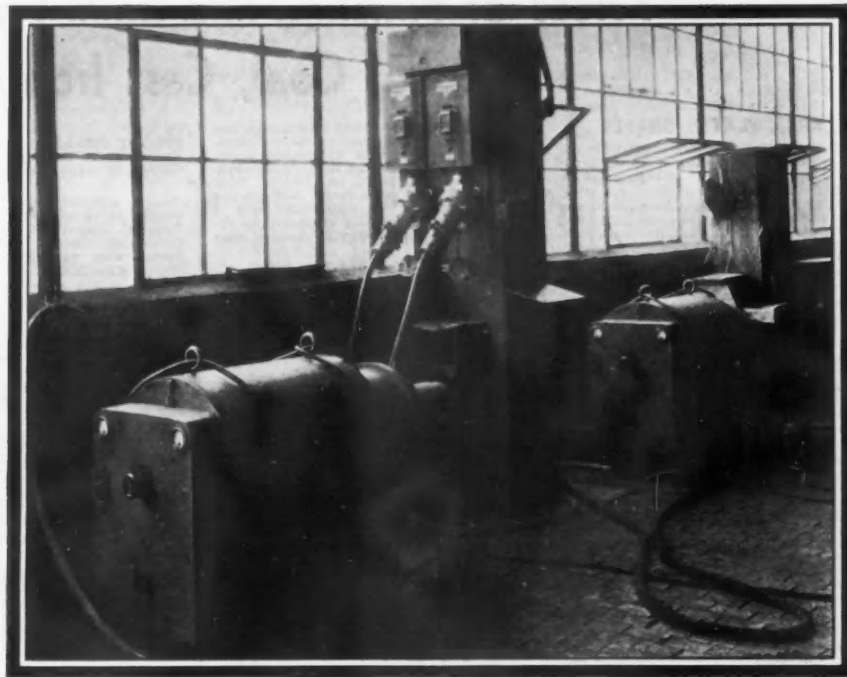
W. J. FILBERT

lor retires as chairman of the finance committee and will be succeeded in that capacity by William J. Filbert, now vice-chairman of the finance committee. Mr. Taylor will continue his other offices as chairman of the board of directors and chief executive officer.

Barium Steel Corp. Arranges Stock Issue

BARIUM STEEL CORPN., Canton, Ohio, recently organized, has arranged for stock issue totaling \$225,000, considerable portion of proceeds to be used for acquisition of local plant of Canton Steel Products, Inc., and Luntz Iron & Steel Co., Inc., joint owners, and for extensions and improvements, including new equipment. Plant will be converted for production of stainless steels from scrap in open-hearth furnaces under special process. Two affiliated interests have been formed under name of Rentschler Steel Chemicals, Inc., and Barium Open-Hearth Furnace, Inc., respectively. Lawrence K. Diffenderfer, Canton, formerly treasurer of Vanadium Corp. of America, New York, is president; Lawrence C. Miller, previously connected with same organization, is secretary and treasurer.

Two of a group of twelve Westinghouse FlexArc 400-amp. Welders in a large Mid-western boiler shop.



TOUGH Windings

assure lower maintenance for FlexArc Welders

● WHEN you buy an arc welding machine, don't fail to investigate its insulation. Upon this protection depends the very life of the machine . . . and, probably more than upon any other feature, the money you'll spend for maintenance.

The features listed at the right show some of the insulation advantages of FlexArc Welders that insure permanent, trouble-free protection for the windings and lower heat rise throughout the machine.

Age-proof insulation is but one of the money-saving features of FlexArc Welders. Others include: Maximum bead-feet per minute . . . minimum metal spattering . . . easy arc control . . . and minimum power consumption.

These exclusive features protect FlexArc Welder insulation from deterioration:

MICA-ARMORED COILS—Hand-picked mica . . . the highest grade electrical-insulating and heat-resisting material . . . is liberally used in slot sections and on bends of every armature coil.

MOISTURE-PROOF INSULATION—Plastic, crack-proof insulating compound is applied to field coils under vacuum. This insulation will not crack under temperature changes and, hence, is moisture-proof.

DIRECTED VENTILATION—Air is circulated through the motor and generator by an exclusive system of blowers and baffles, effectively discharging all dissipated heat. "Heat-aging" of insulation is thus eliminated.

Westinghouse

Quality workmanship guarantees every Westinghouse product



SEND FOR BOOKLET

Westinghouse Electric & Manufacturing Company
Room 2-N—East Pittsburgh, Pa.

Gentlemen: Please send me your booklet on FlexArc Welders.

Name

Position

CompanyT 79827

AddressIA 11-30-33

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars Soft Steel

| | Base per Lb. |
|-----------------------------|--------------|
| F.o.b. Pittsburgh mill | 1.75c |
| F.o.b. Chicago or Gary | 1.80c |
| Del'd Philadelphia | 2.04c |
| Del'd New York | 2.08c |
| F.o.b. Cleveland | 1.80c |
| F.o.b. Buffalo | 1.85c |
| F.o.b. Birmingham | 1.90c |
| F.o.b. cars dock Pacific | 2.30c |
| F.o.b. cars dock Gulf ports | 2.15c |

Steel

| | Base per Lb. |
|-------------------|--------------|
| F.o.b. Cleveland | 1.70c |
| F.o.b. Chicago | 1.70c |
| F.o.b. Gary | 1.70c |
| F.o.b. Pittsburgh | 1.65c |
| F.o.b. Buffalo | 1.75c |
| F.o.b. Birmingham | 1.80c |

Steel Reinforcing

| | |
|---|-------|
| (Stock lengths as quoted by distributors; cutting to length, 80 in. and over takes extra of 10c. per 100 lb.) | |
| F.o.b. P'gh mills | 1.80c |
| F.o.b. Birmingham | 1.85c |
| F.o.b. Buffalo | 1.85c |
| F.o.b. Cleveland | 1.85c |
| F.o.b. Youngstown | 1.85c |
| F.o.b. Chicago or Gary | 1.85c |
| F.o.b. cars dock Pacific ports | 2.35c |
| F.o.b. cars dock Gulf ports | 2.20c |

Rail Steel Reinforcing

| | |
|---|-------|
| (Cut lengths as quoted by distributors) | |
| F.o.b. Pittsburgh | 1.75c |
| F.o.b. Cleveland | 1.80c |
| F.o.b. Chicago | 1.80c |

Iron

| | |
|---------------------------------|-------|
| Common iron, f.o.b. Chicago | 1.60c |
| Refined iron, f.o.b. P'gh mills | 2.75c |
| Common iron, del'd Phila. | 1.89c |
| Common iron del'd New York | 1.93c |

Steel Car Axles

| | |
|-------------------|-------|
| F.o.b. Pittsburgh | 2.50c |
| F.o.b. Chicago | 2.50c |

Tank Plates

| | Base per Lb. |
|-----------------------------------|--------------|
| F.o.b. Pittsburgh mill | 1.75c |
| F.o.b. Chicago | 1.75c |
| F.o.b. Gary | 1.75c |
| F.o.b. Birmingham | 1.85c |
| Del'd Cleveland | 1.85c |
| Del'd Philadelphia | 1.85c |
| Del'd Chicago | 1.85c |
| F.o.b. Sparrows Point | 1.80c |
| Del'd New York | 1.93c |
| F.o.b. dock cars Pacific | 2.25c |
| F.o.b. cars dock Gulf ports | 2.10c |
| Wrought iron plates, f.o.b. P'gh. | 3.00c |

Floor Plates

| | |
|-------------------|-------|
| F.o.b. Pittsburgh | 3.20c |
| F.o.b. Chicago | 3.25c |

Structural Shapes

| | Base per Lb. |
|---|--------------|
| F.o.b. Pittsburgh mill | 1.70c |
| F.o.b. Chicago | 1.75c |
| F.o.b. Birmingham | 1.85c |
| F.o.b. Buffalo | 1.80c |
| F.o.b. Bethlehem | 1.80c |
| Del'd Cleveland | 1.85c |
| Del'd Philadelphia | 1.90c |
| Del'd New York | 1.93c |
| F.o.b. cars dock Gulf ports | 2.10c |
| F.o.b. dock cars Pacific ports (stand- ard) | 2.25c |
| F.o.b. dock cars Pacific ports (wide flange) | 2.35c |

Steel Sheet Piling

| | Base per Lb. |
|--------------------------------|--------------|
| F.o.b. Pittsburgh | 2.00c |
| F.o.b. Chicago mill | 2.10c |
| F.o.b. Buffalo | 2.10c |
| F.o.b. cars dock Gulf ports | 2.45c |
| F.o.b. cars dock Pacific ports | 2.45c |

Alloy Steel Bars

| | |
|--|--|
| F.o.b. Pittsburgh, Chicago, Buffalo, Beth- lehem, Massillon or Canton. | |
| Open-hearth grade, base, 2.45c, a lb. ex- cent at Bethlehem where the price is 2.55c. | |
| S.A.E. | |

| Series | Differential per 100 Lb. |
|--|-----------------------------|
| Numbers | |
| 2000 (1% Nickel) | 0.05 |
| 2100 (2 1/2% Nickel) | 0.55 |
| 2300 (3 1/4% Nickel) | 1.50 |
| 2500 (5% Nickel) | 2.25 |
| 3100 Nickel Chromium | 0.55 |
| 3200 Nickel Chromium | 1.35 |
| 3300 Nickel Chromium | 3.80 |
| 3400 Nickel Chromium | 3.20 |
| 4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum) | 0.50 |
| 4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum) | 0.70 |
| 4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum), (1.50 to 2.00 Nickel) | 1.05 |
| 5100 Chromium Steel (0.60 to 0.90 Chromium) | 0.35 |
| 5100 Chromium Steel (0.80 to 1.10 Chromium) | 0.45 |
| 5100 Chromium Soring | 1.20 |
| 6100 Chromium Vanadium Bar | 1.20 |
| 6100 Chromium Vanadium Soring | |
| Steel | 0.95 |
| Chromium Nickel Vanadium | 1.50 |
| Carbon Vanadium | 0.95 |
| Above prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The | |

differential for cold-drawn bars is 1/4c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Cold Finished Bars*

| | Base per Lb. |
|--------------------------------------|--------------|
| Bars, f.o.b. Pittsburgh mill | 1.95c |
| Bars, f.o.b. Chicago | 2c |
| Bars, Cleveland | 2c |
| Bars, Buffalo | 2c |
| Bars, Detroit | 2.15c |
| Bars, eastern Michigan | 2.20c |
| Precision round bars, Pittsburgh | 2.15c |
| Precision round bars, Cleveland | 2.20c |
| Precision round bars (alloy), Pitts. | 2.85c |
| Shafting, ground, f.o.b. mill. | |
| 1 1/2 in. | 3.25c |
| 1-3/16 to 1 1/2 in. | 2.75c |
| 1-9/16 to 1 1/2 in. | 2.60c |
| 1-15/16 to 2 in. | 2.45c |
| 2-15/16 to 3 in. | 2.30c |

* In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

| | Base per Lb. |
|----------------------------------|--------------|
| No. 10, f.o.b. Pittsburgh | 1.75c |
| No. 10, f.o.b. Gary | 1.85c |
| No. 10, del'd Phila. | 2.04c |
| No. 10, f.o.b. Birmingham | 1.90c |
| No. 10, f.o.b. dock cars Pacific | 2.42 1/2c |

| | Base per Lb. |
|----------------------------------|--------------|
| No. 24, f.o.b. Pittsburgh | 2.25c |
| No. 24, f.o.b. Gary | 2.35c |
| No. 24, del'd Phila. | 2.54c |
| No. 24, f.o.b. Birmingham | 2.40c |
| No. 24, f.o.b. dock cars Pacific | 2.95c |
| No. 24, wrought iron, Pittsburgh | 4.30c |

| | Base per Lb. |
|---------------------------------------|--------------|
| No. 10 gage, f.o.b. Pittsburgh | 2.30c |
| No. 10 gage, f.o.b. Gary | 2.40c |
| No. 10 gage, del'd Phila. | 2.59c |
| No. 10 gage, f.o.b. dock cars Pacific | 3.00c |

| | Base per Lb. |
|---------------------------------------|--------------|
| No. 20 gage, f.o.b. Pittsburgh | 2.75c |
| No. 20 gage, f.o.b. Gary | 2.85c |
| No. 20 gage, del'd Phila. | 3.04c |
| No. 20 gage, f.o.b. dock cars Pacific | 4.45c |

| | Base per Lb. |
|----------------------------------|--------------|
| No. 24, f.o.b. Pittsburgh | 2.85c |
| No. 24, f.o.b. Gary | 2.95c |
| No. 24, del'd Phila. | 3.14c |
| No. 24, f.o.b. Birmingham | 3.00c |
| No. 24, f.o.b. dock cars Pacific | 3.55c |
| No. 24, wrought iron, Pittsburgh | 4.95c |

| | Base per Lb. |
|----------------------------------|--------------|
| No. 24, unassorted 8-lb. coating | 2.90c |
| f.o.b. Pittsburgh | 2.90c |

| | Base per Lb. |
|---------------------------|--------------|
| No. 20, f.o.b. Pittsburgh | 2.90c |
| No. 28, f.o.b. Pittsburgh | 2.50c |
| No. 28, Gary | 2.60c |

| | Base per Box |
|--------------------------------------|--------------|
| Standard cokes, f.o.b. P'gh district | \$4.65 |
| Standard cokes, f.o.b. Gary | 4.75 |

| | Base per Box |
|----------------------------|--------------|
| Terne Plate | |
| (F.o.b. Pittsburgh) | |
| (Per Package, 20 x 28 in.) | |
| 8-lb. coating I.C. | \$8.70 |
| 15-lb. coating I.C. | 11.60 |
| 20-lb. coating I.C. | 11.90 |
| 25-lb. coating I.C. | 13.00 |
| 30-lb. coating I.C. | 13.80 |
| 40-lb. coating I.C. | 15.30 |

| | Base per Lb. |
|--|--------------|
| Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in. | |
| All widths up to 24 in., P'gh. | 1.75c |
| All widths up to 24 in., Chicago | 1.85c |
| Cooperage stock, Pittsburgh | 1.85c |
| Cooperage stock, Chicago | 1.95c |

| | Base per Lb. |
|-------------------|--------------|
| F.o.b. Pittsburgh | 2.40c |
| F.o.b. Cleveland | 2.40c |
| Del'd Chicago | 2.68c |
| F.o.b. Worcester | 2.60c |

| | Base per Lb. |
|---------------------------------|--------------|
| No. 20, Pittsburgh or Cleveland | 3.10c |

WIRE PRODUCTS

| | |
|---|-------|
| (Carload lots, f.o.b. Pittsburgh and Cleve- land.) | |
| To Manufacturing Trade | |
| Bright wire | 2.10c |
| Soring wire | 3.10c |

| | Per Lb. |
|---|---------|
| To Jobbing Trade | |
| Extras of 10c. a 100 lb. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire products. An allowance of \$2 a ton is made to jobbers on straight, mixed or joint carloads; \$3 a ton is allowed on less-than- carload shipments. | |

| | Base per Keg |
|---------------------|--------------|
| Standard wire nails | \$2.10 |
| Smooth coated nails | 2.10 |
| Galvanized nails | 3.60 |

| | Base per 100 Lb. |
|-------------------------------|------------------|
| Smooth annealed wire | \$2.25 |
| Smooth galvanized wire | 2.60 |
| Polished staples | 2.80 |
| Galvanized staples | 3.05 |
| Barbed wire, galvanized | 2.60 |
| Woven wire fence, base column | 55.00 |

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are \$2 a ton over Pittsburgh (except for woven wire fence at Duluth which is \$3 over Pittsburgh), and Birmingham mill prices are \$3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio Mills

| | Steel | Wrought Iron |
|--------|-------------|---------------------|
| Inches | Black Galv. | Inches Black Galv. |
| 1/4 | 51% 29 1/2 | 1/4 +91% +138 |
| 3/8 | 57 38 1/2 | 3/8 +1% +21 1/2 |
| 1/2 | 62 50 1/2 | 1/2 31% 20 1/2 |
| 3/4 | 65 53 1/2 | 3/4 36% 25 1/2 |
| 1 to 3 | 67 54 1/2 | 1 41% 29 1/2 25 1/2 |

| | Lap Weld |
|------------|------------|
| 2 | 63% 54 1/2 |
| 2 1/2 to 3 | 63% 57 1/2 |
| 3 1/2 to 4 | 68 59 1/2 |
| 7 and 8 | 67 57 1/2 |
| 9 and 10 | 67 57 |
| 11 and 12 | 66 56 |

| | Lap Weld |
|------------|------------|
| 2 | 63% 54 1/2 |
| 2 1/2 to 3 | 63% 57 1/2 |
| 3 1/2 to 4 | 68 59 1/2 |
| 7 and 8 | 67 57 1/2 |
| 9 and 10 | 67 57 |
| 11 and 12 | 66 56 |

| | Lap Weld |
|------------|------------|
| 2 | 63% 54 1/2 |
| 2 1/2 to 3 | 63% 57 1/2 |
| 3 1/2 to 4 | 68 59 1/2 |
| 7 and 8 | 67 57 1/2 |
| 9 and 10 | 67 57 |
| 11 and 12 | 66 56 |

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base of two cents on steel and of 10 per cent on charcoal delivered base in 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

| | Base Discounts, f.o.b. Pittsburgh |
|-----------------|-----------------------------------|
| Steel | |
| 2 in. and 3 1/2 | 1 1/2 in. 1 |
| 3 1/2 to 4 | 1 1/2 in. 8 |
| 4 1/2 to 6 | 2 in. 13 |
| 6 to 8 | 2 1/2 in. 16 |
| 8 to 10 | 3 in. 17 |
| 10 to 12 | 3 1/2 in. 18 |
| 12 to 14 | 4 in. 20 |
| 14 to 16 | 4 1/2 in. 21 |

On lots of a carload or more, the above base discounts are subject to a preferential of two cents on steel and of 10 per cent on charcoal delivered base in 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Lap welded steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

| | Cold-Drawn |
|--------------------|------------|
| 1 in. | 61 |
| 1 1/4 to 1 1/2 in. | 53 |
| 1 1/2 in. | 37 |
| 2 to 2 1/2 in. | 34 |
| 3 in. | 47 |
| 3 1/2 to 4 in. | 41 |
| 4 to 4 1/2 in. | 44 |
| 4 1/2 in. | 46 |
| 4 1/2 to 5 in. | 46 |
| 5 to 6 in. | 46 |

| | Hot-Rolled |
|-----------------|------------|
| 2 and 2 1/2 in. | 33 |
| 2 1/2 to 3 in. | 33 |
| 3 to 3 1/2 in. | 33 |
| 3 1/2 to 4 in. | 33 |
| 4 to 4 1/2 in. | 33 |
| 4 1/2 to 5 in. | 33 |
| 5 to 6 in. | 33 |

In the case of all sizes except 1-in. to 1 1/4-in. cold-drawn boiler tubes supplementary discounts of two 5 per cents are allowed on carload lots. On quantities up to 10,000 lb. the base discount is reduced 10 points and a supplementary discount of 5 per cent only is allowed. On quantities 10,000 lb. to 24,999 lb. the base discount is reduced 6 points and a supplementary discount of 5 per cent only is allowed. On 25,000 lb. to a carload the base discount is reduced 2 points and supplementary discounts of two 5 per cents are allowed. On 1 to 1 1/4-in. cold-drawn boiler tubes,

there are no supplementary discounts. On quantities up to 10,000 lb. the base discount is reduced 12 points; on 10,000 lb. to 24,999 lb., it is reduced 8 points; on 25,000 lb. to a carload it is reduced 3 points.

Seamless Mechanical Tubing

| | Per Cent Off List |
|---|-------------------|
| Carbon, 0.10% to 0.30% base (carloads) | 32 |
| Carbon, 0.30% to 0.40% base | 34 |
| Plus differential for lengths over 18 ft. and for commercial exact lengths. Ware- house discounts on small lots are less than the above. | |

RAILS AND TRACK SUPPLIES

F.o.b. Mill

| | |
|--|-------------|
| Standard rails, 60-lb. and heavier, per gross ton | \$36.37 1/2 |
| Angle bars, per 100 lb. | 2.55 |

F.o.b. Code Basing Points

| | |
|--|---------|
| Light rails (from billets) per gross ton | \$32.00 |
| Light rails (from rail steel) per gross ton | \$1.00 |

| | Base per 100 Lb. |
|---|----------------------|
| Spikes, 9/16 in. and larger | \$2.40 |
| Spikes, 1/2 in. and smaller | 2.40 |
| Spikes, boat and barge | 2.40 |
| Tie plates, steel | 1.90 |
| Track bolts, to steam railroads | 2.40 |
| Track bolts, to jobbers, all sizes (per 100 count) | 70 per cent off list |

BOLTS, NUTS, RIVETS AND SET SCREWS

Boilts and Nuts

| | |
|--|-------------------|
| (F.o.b. Pittsburgh, Cleveland, Birming- ham or Chicago) | |
| Machine bolts | 70 |
| Carriage bolts | 70 |
| Lag bolts | 70 |
| Plug bolts, Nos. 1, 2, 3 and 7 heads | 70 |
| Hot-pressed nuts, blank or tapped, square | 70 |
| Hot-pressed nuts, blank or tapped, hexagons | 70 |
| C.p.e. and t. square or hex nuts, blank or tapped | 70 |
| Semi-finished hexagon nuts | 70 |
| Semi-finished hexagon castellated nuts, S.A.E. | 70 |
| Stove bolts in packages, P'gh. | 72 1/2, 25 and 10 |
| Stove bolts in packages, Chicago | 72 1/2, 25 and 10 |
| Stove bolts in packages, Cleveland | 72 1/2, 25 and 10 |
| Stove bolts in bulk, P'gh. | 85 |
| Stove bolts in bulk, Chicago | 85 |
| Stove bolts in bulk, Cleveland | 85 |
| Tire bolts | 80 |

Large Rivets

| | Base per 100 Lb. |
|--------------------------------|------------------|
| F.o.b. Pittsburgh or Cleveland | \$2.75 |
| F.o.b. Chicago and Birmingham | 2.85 |

Small Rivets

| | Per Cent Off List |
|------------------------------|-------------------|
| F.o.b. Pittsburgh | 70 and 10 |
| F.o.b. Cleveland | 70 and 10 |
| F.o.b. Chicago and Birm'g'm. | 70 and 10 |

Cap and Set Screws

| | |
|--|-----------|
| (Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more) | |
| Milled cap screw, 1 in. dia. and smaller | 85 |
| Milled standard set screws, case hard- ened, 1 in. dia. and smaller | 80 |
| Milled headless set screws, cut thread 1/4 in. and smaller | 75 and 10 |
| Unset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller | 85 and 10 |
| Unset set screws, sq. head | 80 |
| Milled studs | 70 |

STAINLESS STEEL

| | |
|---|---------|
| (Max. 16% Cr, 6% Ni, 0.15% C) (Base Prices, f.o.b. Pittsburgh) | |
| Bars | 20 1/2c |
| Plates | 24c |
| No. 20 gage cold-rolled sheets | 30c |
| Hot-rolled strip | 19 1/2c |
| Cold-rolled strip, 0.100 or over | 25c |

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

| | |
|--|---------|
| F.o.b. Pittsburgh, Youngstown, Chicago, Gary, Buffalo, Cleveland, Birmingham. | |
| Per Gross Ton | |
| Revolving | \$26.00 |
| Forging quality | \$1.00 |

Sheet Bars

| | |
|---|---------|
| F.o.b. Pittsburgh, Youngstown, Cleve- land, Chicago, Buffalo, Canton, Sparrows Point. | |
| Per Gross Ton | |
| Open-hearth or Bessemer | \$26.00 |

Skelp

| | |
|---|-------|
| F.o.b. Pittsburgh, Youngstown, Chicago, Buffalo, Coatesville, Pa., or Sparrows Point, Md. | |
| Per Lb. | |
| Grooved | 1.60c |
| Universal | 1.60c |
| Sheared | 1.60c |

Wire Rods

(Common soft, base)

| | Per Gross Ton |
|-------------------|---------------|
| Pittsburgh | \$35.00 |
| Cleveland | 35.00 |
| Chicago | 36.00 |
| Birmingham | 38.00 |
| Youngtown (del'd) | 36.00 |

ALLOY STEEL BLOOMS, BILLETS AND SLABS

F.o.b. Pittsburgh, Chicago, Buffalo, Hamilton, Canton or Bethlehem.
Base price, \$40 a gross ton except at Bethlehem, where it is \$51.

CARBON STEEL FORGING INGOTS

F.o.b. Pittsburgh, Youngstown or Chicago.
Uncropped, \$28 per gross ton.

COKE, COAL AND FUEL OIL

Coke

| | Per Net Ton |
|--|----------------|
| Furnace, f.o.b. Connellsville | \$3.75 |
| Prompt | |
| Foundry, f.o.b. Connellsville | \$4.25 to 5.25 |
| Foundry, by-product, Chicago | 8.50 |
| Foundry, by-product, outside switching districts | |
| Foundry, by-product, delivered in Chicago switching district | 9.25 |
| Foundry, by-product, New England, delivered | 10.50 |
| Foundry, by-product, Newark or Jersey City, del'd | 8.30 to 8.50 |
| Foundry, by-product, Philadelphia | 8.50 |
| Foundry, by-product, Cleveland delivered | 9.27 |
| Foundry, Birmingham | 4.75 |
| Foundry, by-product, St. Louis, f.o.b. ovens | 8.00 |
| Foundry, by-product, del'd St. Louis | 9.00 |

Coal

| | Per Net Ton |
|--|------------------|
| Mine run steam coal, f.o.b. W. Pa. mines | \$1.55 to \$1.80 |
| Mine run coking coal f.o.b. W. Pa. mines | 1.80 to 2.00 |
| Gas coal, 4-in., f.o.b. Pa. mines | 2.00 to 2.30 |
| Mine run gas coal, f.o.b. Pa. mines | 1.80 to 2.20 |
| Steam slack, f.o.b. W. Pa. mines | 1.30 to 1.40 |
| Gas slack, f.o.b. W. Pa. mines | 1.65 to 1.85 |

Fuel Oil

| | Per Gal. f.o.b. Bayonne, N. J. |
|---------------------------|--------------------------------|
| No. 3 distillate | 40c. |
| No. 4 industrial | 35c. |
| | Per Gal. f.o.b. Baltimore |
| No. 3 distillate | 40c. |
| No. 4 industrial | 35c. |
| | Per Gal. del'd Chicago |
| No. 3 industrial fuel oil | 37c. |
| No. 5 industrial fuel oil | 32c. |
| | Per Gal. f.o.b. Cleveland |
| No. 3 distillate | 55c. |
| No. 4 industrial | 52c. |

REFRACTORIES

Fire Clay Brick

| | Per 1000 f.o.b. Works |
|---------------------------|-----------------------|
| High-heat | Intermediate |
| Duty Brick | Duty Brick |
| Pennsylvania | \$45.00 |
| Maryland | 45.00 |
| New Jersey | 45.00 |
| Ohio | 45.00 |
| Kentucky | 45.00 |
| Missouri | 45.00 |
| Illinois | 45.00 |
| Ground fire clay, per ton | 7.00 |

Chrome Brick

| | Per Net Ton |
|---------------|-------------|
| Standard size | \$45.00 |

Silica Brick

| | Per 1000 f.o.b. Works |
|----------------------|-----------------------|
| Pennsylvania | \$45.00 |
| Chicago | 54.00 |
| Birmingham | 55.00 |
| Silica clay, per ton | 8.00 |

Magnesite Brick

| | Per Net Ton |
|---|-------------|
| Standard sizes, burned, f.o.b. Baltimore and Chester, Pa. | \$45.00 |
| Unburned, f.o.b. Baltimore and Chester, Pa. | 52.00 |
| Grain magnesite, f.o.b. Baltimore and Chester, Pa. | 40.00 |
| Domestic, f.o.b. Chewelah, Wash. | 22.00 |

CAST IRON PIPE

| | Per Net Ton |
|------------------------------------|--------------------|
| 4-in. and larger, del'd Chicago | \$44.00 to \$45.00 |
| 4-in., del'd Chicago | 47.00 to 48.00 |
| 4-in. and larger, del'd New York | 43.00 |
| 4-in., del'd New York | 46.00 |
| 4-in. and larger, Birmingham | 36.00 to 37.00 |
| 4-in. Birmingham | 39.00 to 40.00 |
| Class "A" and gas pipe, \$3 extra. | |

Pig Iron, Ores, Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

| Basing Points | No. 2 Fdry. | Malleable | Basic | Bessemer |
|---------------------|-------------|-----------|---------|----------|
| Everett, Mass. | \$18.00 | \$18.50 | \$17.50 | \$19.00 |
| Bethlehem, Pa. | 17.50 | 18.00 | 17.00 | 18.50 |
| Birdsboro, Pa. | 17.50 | 18.00 | 17.00 | 18.50 |
| Swedeland, Pa. | 17.50 | 18.00 | 17.00 | 18.50 |
| Sparrows Point, Md. | 17.50 | 18.00 | 17.00 | 18.50 |
| Neville Island, Pa. | 18.00 | 18.00 | 17.50 | 18.50 |
| Shurpsville, Pa. | 17.50 | 17.50 | 17.00 | 18.00 |
| Youngstown | 17.50 | 17.50 | 17.00 | 18.00 |
| Buffalo | 17.50 | 18.00 | 16.50 | 18.50 |
| Erie, Pa. | 17.50 | 18.00 | 17.00 | 18.50 |
| Cleveland | 17.50 | 17.50 | 17.00 | 18.00 |
| Toledo, Ohio | 17.50 | 17.50 | 17.00 | 18.00 |
| Detroit | 17.50 | 17.50 | 17.00 | 18.00 |
| Hamilton, Ohio | 17.50 | 17.50 | 17.00 | 18.00 |
| Chicago | 17.50 | 17.50 | 17.00 | 18.00 |
| Granite City, Ill. | 17.50 | 18.00 | 17.00 | 18.00 |
| Duluth, Minn. | 18.00 | 18.00 | 17.00 | 18.50 |
| Birmingham | 13.50 | 13.50 | 12.50 | 14.50 |
| Provo, Utah | 16.50 | 16.50 | 15.50 | 17.50 |

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

| | No. 2 Fdry. | Malleable | Basic | Bessemer |
|-------------------------------|-------------|-----------|---------|----------|
| Boston Switching District | \$19.00 | \$19.00 | \$18.00 | \$19.50 |
| From Everett, Mass. | 13.50 | 19.00 | 18.00 | 19.50 |
| Brooklyn | | | | |
| From East. Pa. or Buffalo | 19.77 | 20.27 | 19.27 | 20.77 |
| Newark or Jersey City, N. J. | 18.89 | 19.39 | 18.39 | 19.89 |
| From East. Pa. or Buffalo | | | | |
| Philadelphia | 18.26 | 18.76 | 17.76 | 19.26 |
| From Eastern Pa. | | | | |
| Cincinnati | 18.51 | 18.51 | 18.01 | 19.01 |
| From Hamilton, Ohio | | | | |
| Canton, Ohio | 18.76 | 18.76 | 18.01 | 19.01 |
| From Cleveland and Youngstown | | | | |
| Columbus, Ohio | 19.50 | 19.50 | 18.01 | 19.01 |
| From Hamilton, Ohio | | | | |
| Mansfield, Ohio | 19.26 | 19.26 | 18.01 | 19.01 |
| From Cleveland and Toledo | | | | |
| Indianapolis | 19.77 | 19.77 | 18.01 | 19.01 |
| From Hamilton, Ohio | | | | |
| South Bend, Ind. | 19.55 | 19.55 | 18.01 | 19.01 |
| From Chicago | | | | |
| Milwaukee | 18.50 | 18.50 | 18.01 | 19.01 |
| From Chicago | | | | |
| St. Paul | 19.44 | 19.44 | 18.01 | 19.01 |
| From Duluth | | | | |
| Davenport, Iowa | 19.26 | 19.26 | 18.01 | 19.01 |
| From Chicago | | | | |
| Kansas City | 20.04 | 20.54 | 18.01 | 19.01 |
| From Granite City | | | | |

Delivered prices on Southern iron for shipment to Northern points are 3½¢ a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

| Basing points: | Birdsboro, Pa., Steelton, Pa., and Standish, N. Y. |
|-----------------------|--|
| Johnson City, Tenn. | \$22.00 |
| F.o.b. Valley furnace | 22.00 |
| Del'd Chicago | 27.65 |

GRAY FORCE PIG IRON

| | |
|----------------|---------|
| Valley furnace | \$17.50 |
|----------------|---------|

CHARCOAL PIG IRON

| | |
|-----------------------|---------|
| Lake Superior furnace | \$20.50 |
| Delivered Chicago | 23.54 |
| Delivered Buffalo | 23.78 |

CANADA

Pig Iron

| Per gross ton: | |
|-------------------------------|---------|
| Delivered Toronto | |
| No. 1 fdy., sil. 2.25 to 2.75 | \$21.00 |
| No. 2 fdy., sil. 1.75 to 2.75 | 20.50 |
| Malleable | 21.00 |
| Delivered Montreal | |
| No. 1 fdy., sil. 2.25 to 2.75 | \$22.50 |
| No. 2 fdy., sil. 1.75 to 2.25 | 22.00 |
| Malleable | 22.50 |
| Basic | 22.00 |

Ferromanganese

| | Per Gross Ton |
|--|---------------|
| Domestic, 80%, seaboard, (carload) | \$32.00 |
| Domestic, 80%, seaboard, (less carloads) | 29.00 |

Spiegeleisen

| | Per Gross Ton Furnace |
|---------------------|-----------------------|
| Domestic, 19 to 21% | \$27.00 |

Electric Ferrosilicon

| | Per Gross Ton Delivered |
|--------------------------------|-------------------------|
| 50% (carloads) | \$74.50 |
| 50% (less carloads) | 82.00 |
| 75% (carloads) | 120.00 |
| 75% (less carloads) | 130.00 |
| Ont. (in carloads) (duty paid) | 31.00 |
| 14% to 16% (less carloads) | 38.50 |

Silvery Iron

| | F.o.b. Jackson, Ohio, Furnace |
|-----|-------------------------------|
| | Per Gross Ton |
| 6% | \$22.25 |
| 7% | 22.25 |
| 8% | 24.25 |
| 9% | 25.25 |
| 10% | 26.25 |
| 11% | 27.75 |
| | Per Gross Ton |
| 12% | \$29.25 |
| 13% | 30.75 |
| 14% | 32.25 |
| 15% | 33.75 |
| 16% | 35.25 |
| 17% | 36.75 |

Bessemer Ferrosilicon

| | F.o.b. Jackson, Ohio, Furnace |
|-----|-------------------------------|
| | Per Gross Ton |
| 10% | \$27.25 |
| 11% | 28.75 |
| 12% | 30.25 |
| 13% | 31.75 |

Manganese 1½ to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Other Ferroalloys

| | |
|--|--------------------|
| Ferrotungsten, per lb. w. del., carloads | \$4c. |
| Ferrotungsten, less carloads | \$1.00 |
| Ferrosilicon, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads | 9.50c. |
| Ferrosilicon, 2% carbon | 16.50 to 17.00c. |
| Ferrosilicon, 1% carbon | 17.50c. to 18.00c. |
| Ferrosilicon, 0.10% carbon | 19.50c. to 20.00c. |
| Ferrosilicon, 0.06% carbon | 20.00c. to 20.50c. |

Iron and Steel Scrap

PITTSBURGH

| Per gross ton delivered consumers' yards: | |
|---|--------------------|
| No. 1 heavy melting steel | \$11.25 to \$11.75 |
| No. 2 heavy melting steel | 10.25 to 10.75 |
| No. 2 railroad wrought | 11.25 to 11.75 |
| Scrap rails | 11.25 to 11.75 |
| Rails 3 ft. and under | 14.00 to 14.50 |
| Sheet car crops, ordinary | 13.00 to 13.50 |
| Compressed sheet steel | 11.25 to 11.75 |
| Hand bundled sheet steel | 10.25 to 10.75 |
| Hvy. steel axle turnings | 10.25 to 10.75 |
| Machine shop turnings | 7.50 to 8.00 |
| Short shov. steel turnings | 7.50 to 8.00 |
| Short mixed borings and turnings | 7.50 to 8.00 |
| Cast iron borings | 7.50 to 8.00 |
| Cast iron car wheels | 11.00 to 11.50 |
| Heavy breakable cast | 10.25 to 10.75 |
| No. 1 cast | 11.00 to 11.50 |
| Rail. knuckles and couplers | 13.25 to 13.75 |
| Rail. coil and leaf springs | 13.25 to 13.75 |
| Roller steel wheels | 13.25 to 13.75 |
| Low phos. billet crops | 13.00 to 13.50 |
| Low phos. sheet bar crops | 14.50 to 15.00 |
| Low phos. plate scrap | 14.00 to 14.50 |
| Low phos. punchings | 14.50 to 15.00 |
| Steel car axles | 13.50 to 14.50 |

CHICAGO

| Delivered Chicago district consumers: | |
|---------------------------------------|------------------|
| Heavy melting steel | \$8.25 to \$8.75 |
| Shoveling steel | 8.00 to 8.50 |

| | |
|---|------------------|
| Ferrovandium, del., per lb. contained Va. | \$2.00 to \$2.50 |
| Ferrocobaltitum, 15 to 18% per net ton, f.o.b. furnace in carloads | 100.00 |
| Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with \$2 unitage | 50.00 |
| Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage | 65.00 |
| Ferromolybdenum, per lb. Mo., del. | 95c. |
| Calcium molybdate, per lb. Mo., del. | 80c. |
| Silico spiegel, per ton, f.o.b. furnace, car lots | \$38.00 |
| Ton lots or less, per ton | 41.00 |
| Silico-manganese, gross ton, delivered | |
| 2.50% carbon grade | 85.00 |
| 2% carbon grade | 90.00 |
| 1% carbon grade | 100.00 |
| Spot prices | \$5 a ton higher |

Ores

Lake Superior Ores, Delivered Lower Lake Ports

| | Per Gross Ton |
|--------------------------------------|---------------|
| Old range, Bessemer, 51.5% iron | \$4.80 |
| Old range, non-Bessemer, 51.50% iron | 4.65 |
| Mesabi Bessemer, 51.50% iron | 4.65 |
| Mesabi non-Bessemer, 51.50% iron | 4.50 |
| High phosphorus, 51.50% iron | 4.40 |

Foreign Ore, c.i.f. Philadelphia or Baltimore

| | Per Unit |
|---|----------|
| Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian | 8c. |
| Iron, low phos., Swedish, average 68½% iron | 9.50c. |
| Iron, basic or foundry, Swedish, average, 85% iron | 8c. |
| Iron, basic iron (nom.), average, 65% iron | 8c. |
| Manganese, Caucasian, washed 82% | 32c. |
| Manganese, African, Indian, 44-48% | 20c. |
| Manganese, African, Indian, 49-51% | 21c. |
| Manganese, Brazilian, 46 to 48½% | 17c. |

Tungsten, Chinese wolframite, duty paid*

| | |
|-------------------------------|---------|
| Tungsten, domestic scheelite* | \$12.00 |
|-------------------------------|---------|

Chrome, 45%, Cr2O3, crude, c.i.f. Atlantic seaboard

| | |
|---|--------------------|
| Atlantic seaboard, not over 2½% silicon, f.o.b. Illinois and Kentucky mines | \$11.00 to \$12.00 |
|---|--------------------|

Chrome, 48%, Cr2O3, c.i.f. Atlantic seaboard

| | |
|---|---------|
| Atlantic seaboard, not over 2½% silicon, f.o.b. Illinois and Kentucky mines | \$18.00 |
|---|---------|

*Quotations nominal in absence of sales.

Fluorspar

| | Per Net Ton |
|---|-------------|
| Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines | \$15.00 |
| No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines | 16.00 |
| Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid | 18.50 |
| Domestic, No. 1 ground bulk, 85 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines | 30.00 |

| | |
|------------------------------------|------------------|
| Hydraulic comp. sheets | \$7.00 to \$7.50 |
| Drop forge flashings | 6.50 to 7.00 |
| No. 1 busheling | 7.00 to 7.50 |
| Roller car wheels | 8.50 to 9.00 |
| Railroad tires | 10.50 to 11.00 |
| Railroad leaf springs | 8.50 to 9.00 |
| Axle turnings | 7.50 to 8.00 |
| Steel couplers and knuckles | 8.50 to 9.00 |
| Coil springs | 10.50 to 11.00 |
| Axle turnings (elec. fur.) | 7.50 to 8.00 |
| Low phos. punchings | 10.50 to 11.00 |
| Low phos. plates, 12 in. and under | 10.50 to 11.00 |
| Cast iron borings | 5.25 to 5.75 |
| Short shoveling turnings | 5.25 to 5.75 |
| Machine shop turnings | 5.00 to 5.50 |
| Rerolling rails | 9.50 to 10.00 |
| Steel rails, less than 3 ft. | 10.00 to 10.50 |
| Steel rails, less than 2 ft. | 10.50 to 11.00 |
| Angle bars, steel | 9.00 to 9.50 |
| Cast iron car wheels | 9.00 to 9.50 |
| Railroad malleable | 9.00 to 9.50 |
| Agricultural malleable | 7.50 to 8.00 |

Per Net Ton

| | |
|------------------------|--------------------|
| Iron car axles | \$11.00 to \$11.50 |
| Steel car axles | 9.50 to 10.00 |
| No. 1 railroad wrought | 7.25 to 7.75 |
| No. 2 railroad wrought | 7.25 to 7.75 |

| | |
|--------------------------|------------------|
| No. 2 busheling | \$3.50 to \$4.00 |
| Locomotive tires, smooth | 8.50 to 9.00 |
| Pipe and flues | 4.25 to 4.75 |
| No. 1 machinery cast | 8.50 to 9.00 |
| Clean automobile cast | 8.00 to 8.50 |
| No. 1 railroad cast | 7.50 to 8.00 |
| No. 1 agricultural cast | 7.00 to 7.50 |
| Stove plate | 6.00 to 6.50 |
| Grate bars | 6.00 to 6.50 |
| Brake shoes | 7.50 to 8.00 |

PHILADELPHIA

| | |
|---|-------------------|
| Per gross ton delivered consumers' yards: | |
| No. 1 heavy melting steel | \$9.50 to \$10.00 |
| No. 2 heavy melting steel | 8.00 to 8.50 |
| No. 1 railroad wrought | 11.00 |
| Bundled sheets | 8.25 to 8.50 |
| Hydraulic compressed, new | 8.50 to 10.00 |
| Hydraulic compressed, old | 6.00 to 6.50 |
| Machine shop turnings | 5.00 to 5.50 |
| Heavy axle turnings | 9.00 |
| Heavy breakable cast | 9.50 to 10.00 |
| Stove plate (steel works) | 7.50 to 8.00 |
| No. 1 low phos. heavy | 12.00 to 14.00 |
| Couplers and knuckles | 12.00 to 12.50 |
| Roller steel wheels | 12.00 to 12.50 |
| No. 1 blast furnace | 5.00 to 5.50 |
| Spec. iron and steel pipe | 8.50 to 9.00 |
| Shafting | 14.00 to 14.50 |
| Steel axles | 11.50 to 12.00 |
| No. 1 forge | 12.00 to 12.50 |
| Cast iron car wheels | 10.50 to 11.00 |
| No. 1 cast | 11.00 to 11.50 |
| Cast borings (chem.) | 12.00 to 14.00 |
| Steel rails for rolling | 11.00 to 11.50 |

CLEVELAND

| | |
|---|------------------|
| Per gross ton delivered consumers' yards: | |
| No. 1 heavy melting steel | \$9.00 to \$9.50 |
| No. 2 heavy melting steel | 8.50 to 9.00 |
| Compressed sheet steel | 8.50 to 9.00 |
| Light bundled sheet stamp- | 6.50 to 7.00 |
| ings | 9.00 to 9.50 |
| Drop forge flashings | 7.00 to 7.50 |
| Machine shop turnings | 7.50 to 8.00 |
| Short shoveling turnings | 9.00 to 9.50 |
| No. 1 busheling | 7.50 to 8.00 |
| Steel axle turnings | 12.50 to 13.00 |
| Low phos. billet crops | 7.00 to 7.50 |
| Cast iron borings | 7.00 to 7.50 |
| Mixed borings and short | 7.00 to 7.50 |
| turnings | 7.00 to 7.50 |
| No. 2 busheling | 11.00 to 11.50 |
| No. 1 cast | 6.50 to 7.00 |
| Railroad grate bars | 7.50 to 8.00 |
| Store plate | 10.00 to 10.50 |
| Rails under 3 ft. | 10.50 to 11.00 |
| Rails for rolling | 10.00 to 10.50 |
| Railroad malleable | 10.00 to 10.50 |
| Cast iron car wheels | 11.00 |

BUFFALO

| | |
|--|------------------|
| Per gross ton, f.o.b. Buffalo consumers' plants: | |
| No. 1 heavy melting steel | \$9.00 to \$9.50 |
| No. 2 heavy melting steel | 8.00 to 8.50 |
| Scrap rails | 8.50 to 9.00 |
| New hydraulic comp. sheets | 8.00 to 8.50 |
| Old hydraulic comp. sheets | 7.00 to 7.50 |
| Drop forge flashings | 8.00 to 8.50 |
| No. 1 busheling | 8.00 to 8.50 |
| Hvy. steel axle turnings | 8.50 to 9.00 |
| Machine shop turnings | 6.00 to 6.50 |
| Knuckles and couplers | 11.00 to 11.50 |
| Coil and leaf springs | 11.00 to 11.50 |
| Roller steel wheels | 11.00 to 11.50 |
| Low phos. steel strips | 12.50 to 13.00 |
| Short shov. steel turnings | 7.00 to 7.50 |
| Short mixed borings and | 6.00 to 6.50 |
| turnings | 6.00 to 6.50 |
| Cast iron borings | 6.00 to 6.50 |
| No. 2 busheling | 6.00 to 6.50 |
| Steel car axles | 11.00 to 12.00 |
| Iron axles | 11.00 to 12.00 |
| No. 1 machinery cast | 10.50 to 11.00 |
| No. 1 cupola cast | 10.00 to 10.50 |
| Stove plate | 8.75 to 9.25 |
| Steel rails, 3 ft. and under | 12.50 to 13.00 |
| Cast iron car wheels | 10.00 to 10.50 |
| Industrial malleable | 10.50 to 11.00 |
| Railroad malleable | 10.50 to 11.00 |
| Chemical borings | 9.00 to 9.50 |

BIRMINGHAM

| | |
|---|----------------|
| Per gross ton delivered consumers' yards: | |
| Heavy melting steel | \$10.00 |
| Scrap steel rails | 9.00 |
| Short shoveling turnings | 5.50 |
| Stove plate | 7.00 to 7.50 |
| Steel axles | 11.00 to 11.50 |
| Iron axles | 11.00 to 11.50 |
| No. 1 railroad wrought | 7.00 |
| Rails for rolling | 9.00 to 9.50 |
| No. 1 cast | 9.00 to 9.50 |
| Tramcar wheels | 9.00 to 9.50 |
| Cast iron borings, chem. | 8.00 |

ST. LOUIS

| | |
|---|------------------|
| Per gross ton delivered consumers' yards: | |
| Selected heavy steel | \$8.50 to \$9.00 |
| No. 1 heavy melting | 7.50 to 8.00 |
| No. 2 heavy melting | 7.00 to 7.50 |
| No. 1 locomotive tires | 8.00 to 8.50 |
| Misc. stand.-sec. rails | 10.00 to 10.50 |
| Bundled sheets | 6.00 to 6.50 |
| No. 2 railroad wrought | 7.50 to 8.00 |
| No. 1 busheling | 6.50 to 7.00 |
| Cast iron borings and | 4.50 to 5.00 |
| shoveling turnings | 10.25 to 10.75 |
| Machine shop turnings | 4.25 to 4.75 |
| Heavy turnings | 5.50 to 6.00 |
| Steel car axles | 10.00 to 10.50 |
| Iron car axles | 12.50 to 13.00 |
| Wrot. iron bars and trans. | 9.00 to 9.50 |
| No. 1 railroad wrought | 6.25 to 6.75 |
| Steel rails less than 3 ft. | 11.00 to 11.50 |
| Steel angle bars | 11.50 to 12.00 |
| Cast iron car wheels | 6.75 to 7.25 |
| No. 1 machinery cast | 8.75 to 9.25 |
| Railroad malleable | 8.50 to 9.00 |
| No. 1 railroad cast | 8.00 to 8.50 |
| Stove plate | 6.50 to 7.00 |
| Relay rails, 60 lb. and | 16.00 to 16.50 |
| under | |

| | |
|-------------------------|--------------------|
| Relay rails, 60 lb. and | |
| over | \$20.00 to \$21.00 |
| Agricult. malleable | 9.00 to 9.50 |

BOSTON

| | |
|---|--------------------|
| Dealers' buying prices per gross ton: | |
| No. 1 heavy melting steel | \$5.50 to \$6.00 |
| Scrap T rails | 5.50 to 6.00 |
| Machine shop turnings | 2.50 to 2.75 |
| Cast iron borings | 4.00 to 4.25 |
| Bundled skeleton | 4.75 to 5.00 |
| Forge flashings | 4.75 to 5.00 |
| Blast furnace scrap | 4.75 to 5.00 |
| Shafting | 9.00 to 9.50 |
| Steel car axles | 8.50 to 9.00 |
| Wrought pipe | 3.50 to 4.00 |
| Rails for rolling | 6.00 to 6.50 |
| Cast iron borings, chemical | 7.50 to 8.00 |
| Per gross ton delivered consumers' yards: | |
| Textile cast | \$10.00 to \$10.50 |
| No. 1 machinery cast | 10.00 to 10.50 |
| Stove plate | 6.25 to 6.50 |
| Railroad malleable | 11.00 to 12.00 |

NEW YORK

| | |
|---|------------------|
| Dealers' buying prices per gross ton: | |
| Prices in italics for loading on barge; all others for loading on cars. | |
| No. 1 heavy melting steel | \$6.50 to \$7.50 |
| No. 2 heavy melting steel | 5.50 to 6.00 |
| Heavy breakable cast | 5.00 to 6.00 |
| No. 1 machinery cast | 6.50 to 7.00 |
| No. 2 cast | 5.50 to 6.00 |
| Stove plate | 5.50 to 6.00 |
| Steel car axles | 10.00 to 10.50 |
| No. 1 railroad wrought | 7.50 to 8.00 |

PITTSBURGH

| | |
|---|--------|
| Base per Lb. | |
| Plates | 2.85c |
| Structural shapes | 2.85c |
| Soft steel bars and small shapes | 2.85c |
| Reinforcing steel bars | 3.00c |
| Cold-finished and screw stock— | |
| Rounds and hexagons | 3.20c |
| Squares and flats | 3.20c |
| Hoops and bands, under 3/4 in. | 3.10c |
| Hot-rolled annealed sheets (No. 24), | |
| 25 or more bundles | 3.15c |
| Galv. sheets (No. 24), 25 or more | |
| bundles | 3.50c |
| Hot-rolled sheets (No. 10) | 2.85c |
| Galv. corrug. sheets (No. 28), per | |
| square (more than 3750 lb.) | \$3.32 |
| Spikes, large | 2.40c |
| Small | 2.65c |
| Boat | 2.90c |
| Track bolts, all sizes, per 100 count, | |
| 65 per cent off list. | |
| Machine bolts, 100 count, | |
| 65 per cent off list. | |
| Carriage bolts, 100 count, | |
| 65 per cent off list. | |
| Nuts, all styles, 100 count, | |
| 70 per cent off list. | |
| Large rivets, base per 100 lb. | \$3.25 |
| Wire, black, soft ann'd, base per | |
| 100 lb. | 2.90 |
| Wire, galv. soft, base per 100 lb. | 3.35 |
| Common wire nails, per keg | 2.40 |
| Cement coated nails, per keg | 2.40 |
| On plates, structurals, bars, reinforcing | |
| bars, bands, hoops and blue annealed | |
| sheets, base applied to orders of 400 to | |
| 9999 lb. | |

CHICAGO

| | |
|-------------------------------------|-----------------|
| Base per Lb. | |
| Plates and structural shapes | 3.10c |
| Soft steel bars | 2.90c |
| Cold-fin. steel bars and shafting | 3.25c |
| Rounds and hexagons | 3.25c |
| Flats and squares | 3.25c |
| Bands, 3/16 in. (in Nos. 10 and | |
| 12 gages) | 3.20c |
| Hoops (No. 14 gage and lighter) | 3.20c |
| Hot-rolled annealed sheets (No. 24) | 3.70c |
| Galv. sheets (No. 24) | 4.30c |
| Hot-rolled sheets (No. 10) | 2.85c |
| Spikes (9/16 in. and lighter) | 3.50c |
| Track bolts | 4.50c |
| Rivets, structural (keg lots) | 3c |
| Rivets, boiler (keg lots) | 3.10c |
| Per Cent Off List | |
| Machine bolts | 60 and 5 |
| Carriage bolts | 60 and 5 |
| Coach and lag screws | 60 and 5 |
| Hot-pressed nuts, sq., tap, or | |
| blank | 60 and 5 |
| Hot-pressed nuts, hex., tap, or | |
| blank | 60 and 5 |
| Hex. head and cap screws | 85 and 10 |
| Cup point set screws | 75 |
| Flat head bright wood screws | 50 and 10 |
| Spring cotters | 60 and 10 |
| Stove bolts in full packages | 72 1/2 |
| Id. hd. tank rivets, 7/16 in. and | |
| smaller | 65 |
| Wrought washers | \$5.50 off list |
| No. 8 black ann'd wire per 100 lb. | \$3.45 |
| Com. wire nails, base per keg | 2.70c |
| Cement c'd nails, base per keg | 2.70c |

NEW YORK

| | |
|-------------------------------------|----------------|
| Base per Lb. | |
| Plates | 3.27c |
| Structural shapes | 3.27c |
| Soft steel bars, small shapes | 3.17c |
| Iron bars, swed. charcoal | 6.50c to 7.00c |
| Cold-fin. shafting and screw stock: | |
| Rounds and hexagons | 3.79c |
| Flats and squares | 4.29c |
| Cold-roll. strip, soft and quarter | |
| hard | 4.00c |
| Hoops | 3.42c |
| Bands | 3.42c |
| Hot-rolled sheets (No. 10) | 3.17c |
| Hot-rolled ann'd sheets (No. 24*) | 3.65c |
| Galvanized sheets (No. 24*) | 4.25c |
| Long term sheets (No. 24) | 4.75c |
| Standard tool steel | 12.00c |
| Wire, black annealed (No. 10) | 3.30c |
| Wire, galv. annealed (No. 10) | 4.05c |

| | |
|---------------------------|------------------|
| No. 1 yard wrought, long | \$6.50 to \$7.00 |
| Spec. iron and steel pipe | 4.50 to 5.00 |
| Forge fire | 3.50 to 6.00 |
| Rails for rolling | 8.00 to 8.50 |
| Short shoveling turnings | 3.00 to 3.50 |
| Machine shop turnings | 2.50 to 3.00 |
| Cast borings | 4.50 to 4.75 |
| No. 1 blast furnace | 2.50 to 3.00 |
| Cast borings (chemical) | 11.00 to 11.50 |
| Unprepared yard iron and | |
| steel | 2.50 to 3.00 |

| | |
|---|--------|
| Per gross ton, delivered local foundries: | |
| No. 1 machinery cast | \$8.00 |
| No. 1 hvy. cast (cupola | |
| size) | 7.75 |
| No. 2 cast | 7.00 |

CINCINNATI

| | |
|---------------------------------------|------------------|
| Dealers' buying prices per gross ton: | |
| Heavy melting steel | \$7.75 to \$8.50 |
| Scrap rails for melting | 8.50 to 9.00 |
| Loose sheet clippings | 4.75 to 5.25 |
| Bundled sheets | 5.75 to 6.25 |
| Cast iron borings | 5.75 to 6.25 |
| Machine shop turnings | 5.25 to 5.75 |
| No. 1 busheling | 6.00 to 6.50 |
| No. 2 busheling | 3.00 to 3.50 |
| Rails for rolling | 9.00 to 9.50 |
| No. 1 locomotive tires | 8.50 to 9.00 |
| Short rails | 11.25 to 11.75 |
| Cast iron car wheels | 7.75 to 8.25 |
| No. 1 machinery cast | 9.00 to 9.50 |
| No. 1 railroad cast | 8.50 to 9.00 |
| Burnt cast | 6.00 to 6.50 |
| Stove plate | 6.00 to 6.50 |
| Agricultural malleable | 8.00 to 8.50 |
| Railroad malleable | 8.50 to 9.00 |

| | |
|--|-----------------|
| Tire steel 1/4 x 1/2 in. and larger | 3.40c |
| Smooth finish 1 to 2 1/2 x 1/4 in. | |
| and larger | 3.75c |
| Open hearth spring steel, bases | |
| 3/4 x 6 in. and smaller | 3.75c to 10.00c |
| Common wire nails, base, per keg | \$3.00 |
| Machine bolt, cut thread: | |
| 1/4 x 6 in. and smaller | 60 |
| 1 x 30 in. and smaller | 60 |
| Carriage bolts, cut thread: | |
| 1/4 x 6 in. and smaller | 60 |
| 1 x 30 in. and smaller | 50 |
| Boiler tubes: | |
| Lap welded, 2-in. | \$18.05 |
| Seamless welded, 2-in. | 19.24 |
| Charcoal iron, 2-in. | 24.94 |
| Charcoal iron, 4-in. | 63.65 |
| *No. 28 and lighter, 36 in. wide, 20c. | |
| higher per 100 lb. | |

ST. LOUIS

| | |
|--|-------|
| Base per Lb. | |
| Plates and struc. shapes | 3.34c |
| Bars, soft steel or iron | 3.14c |
| Cold-fin. rounds, shafting, screw | |
| stock | 3.59c |
| Hot-rolled annealed sheets (No. 24) | 3.94c |
| Galv. sheets (No. 24) | 4.54c |
| Hot-rolled sheets (No. 10) | 3.19c |
| Black corrug. sheets (No. 24) | 3.65c |
| Galv. corrug. sheets | 4.30c |
| Structural rivets | 3.34c |
| Boiler rivets | 3.44c |
| Per Cent Off List | |
| Tank rivets, 7/16 in. and smaller | 65 |
| Machine and carriage bolts, lag screws, | |
| fitting up bolts, bolt ends, plow bolts, | |
| hot-pressed nuts, square and hexagon, | |
| tapped or blank, semi-finished nuts | |
| 1000 lb. or over | 45 |
| 200 to 999 lb. | 60 |
| 100 to 199 lb. | 55 |
| Less than 100 lb. | 50 |

PHILADELPHIA

| | |
|--------------------------------------|-------|
| Base per Lb. | |
| *Plates, 1/4-in. and heavier | 2.60c |
| *Structural shapes | 2.60c |
| *Soft steel bars, small shapes, iron | |
| bars (except bands), sq., twisted | 2.60c |
| and deform. | 2.28c |
| Cold-finished steel bars | 3.58c |
| *Steel hoops | 3.15c |
| *Steel bands, No. 12 to 3/16 in. | |
| incl. | 2.90c |
| Spring steel | 3.00c |
| *Hot-rolled annealed sheets (No. 24) | 3.40c |
| *Galvanized sheets (No. 24) | 4.00c |
| *Hot-rolled annealed sheets (No. | |
| 10) | 2.75c |
| Diam. pat. floor plates, 1/4 in. | 4.35c |
| Swedish iron bars | 6.00c |

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

‡For 5 tons or more, exclusive of cutting charge.

CLEVELAND

| | |
|-------------------------------------|----------------|
| Base per Lb. | |
| Plates and struc. shapes | 3.21c |
| Soft steel bars | 2.90c |
| Reinforce. steel bars | 2.00c to 2.50c |
| Cold-finished steel bars | 3.25c |
| Flat rolled steel under 1/4 in. | 3.25c |
| Cold-finished strip | 3.55c |
| Hot-rolled annealed sheets (No. 24) | 2.76c |
| Galvanized sheets (No. 24) | 4.36c |
| Hot-rolled sheets (No. 10) | 3.01c |
| Black ann'd wire, per 100 lb. | \$2.55 |
| No. 9 galv. wire, per 100 lb. | 2.90 |
| Com. wire nails, base per keg | 2.35 |

*Net base, including boxing and cutting to length.

CINCINNATI

| | |
|--------------------------|-------|
| Base per Lb. | |
| Plates and struc. shapes | 3.30c |
| Bars, soft steel or iron | 3.10c |

DETROIT

| | |
|---------------------------------------|------------------|
| Dealers' buying prices per gross ton: | |
| Heavy melting steel | \$6.75 to \$7.50 |
| Borings and short turnings | 5.75 to 6.25 |
| Long turnings | 5.25 to 6.10 |
| No. 1 machinery cast | 7.50 to 8.00 |
| Automotive cast | 9.50 to 10.00 |
| Hydraul. comp. sheets | 6.75 to 7.25 |
| Stove plate | 5.75 to 6.25 |
| New factory busheling | 5.75 to 6.25 |
| Old No. 2 busheling | 4.50 to 5.00 |
| Sheet clippings | 4.50 to 5.00 |
| Flashings | 5.50 to 6.00 |
| Low phos. plate scrap | 7.50 to 8.00 |

CANADA

| | |
|---------------------------------------|---------------|
| Dealers' buying prices per gross ton: | |
| Toronto Montreal | |
| Heavy melting steel | \$5.50 \$5.50 |
| Rails, scrap | 6.00 4.50 |
| Machine shop turnings | 2.50 2.50 |
| Boiler plate | 4 |

Pipe Lines

Sun Oil Co., 1608 Walnut Street, Philadelphia, plans steel pipe line from new oil field at Cuevitas, Starr County, Tex., to point near Hebbronville, Tex., where connection will be made with line to oil field at Wells, Duval County, Tex., and from such point, construction of pipe line to distribution terminal at Corpus Christi, Tex., 125 miles total. Company will also expand oil terminal at last noted place.

Board of County Supervisors, Los Angeles, will ask bids soon for about 456 ft. 16-in. standard steel lap-welded pipe, 3/4-in., and about 696 ft. same pipe, same size, 1/4-in., for San Gabriel Dam No. 2, near Azusa, Cal. E. C. Eaton, 202 North Broadway, is county engineer.

St. Francisville, La., plans welded steel pipe line system for natural gas distributing service. Cost about \$50,000.

Skelly Oil Co., Tulsa, Okla., has approved plans for new 6 and 8-in. welded steel pipe line from Cunningham oil field, Kingman County, Kan., to refinery at El Dorado, Kan., about 45 miles. Cost over \$250,000.

Stanolind Pipe Line Co., Philcade Building, Tulsa, Okla., has authorized 6-in. welded steel pipe line from oil field district, Russell County, Kan., to connection with present trunk line system between Stalkenburg and Raymond oil fields, Kan., for crude oil. New line will be used by Stanolind Crude Oil Purchasing Co., an affiliated organization, with storage and distributing terminal at Paradise, Kan.

Railroad Equipment

Western Maryland has taken delivery of 2000 tons of rails and is expected to place an additional order for 2000 tons.

Chicago, Burlington & Quincy has ordered 13,500 tons of 112-lb. rails from Illinois Steel Co., 6500 tons from Inland Steel Co., and 5000 tons from Colorado Fuel & Iron Co. An order for 8000 tons of track fastenings was divided in proportion to the rail award.

Cast Iron Pipe

Paxton, Mass., closed bids Nov. 27 on 26,000 ft. of 6, 8 and 10-in.

Reeds Ferry, N. H., has awarded 100 tons to United States Pipe & Foundry Co.

Chicopee, Mass., closed bids Nov. 28 on 3000 ft. of 10 to 20-in.

Croton On Hudson, N. Y., closed bids Nov. 21 on more than 800 tons of 12-in. and smaller; R. D. Wood Co. was low bidder.

Chicago, Bessemer Foundry & Machine Co. is low bidder on 400 tons of fittings, and Glamorgan Pipe & Foundry Co. is low on 2400 tons of pipe.

Kenosha, Wis., bids on 1300 tons of pipe and fittings are postponed on account of the death of the city engineer.

Wilmette, Ill., will take bids Dec. 6 on 900 tons of 24-in.

Chicago, Sanitary District, will come into the market for \$200,000 worth of pipe.

Carlisle, Ark., plans new water pipe line system. Financing has been arranged for \$60,000, including elevated steel tank and tower.

Belmont, Cal., plans 22,400 ft. of 4 to 8-in. for new water distribution system. Project will include pumping plant. Federal loan of \$45,000 is being arranged. George A. Kneese, Redwood City, Cal., is engineer.

Jefferson City, Mo., plans pipe line system for extensions in municipal water system. Bond issue of \$750,000 is proposed. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Harrisburg, Pa., plans installation of 4 to 8-in. pipe for extensions in water system.

Gadsden, Ala., plans new 18-in. lines to replace present 10-in. water supply main. Cost about \$75,000. Financing is being arranged.

Seal Beach, Cal., plans pipe line for water supply. Estimates of cost are being made by Victor Hayes, city engineer. Financing will soon be arranged.

Elgin, Ill., plans 17,000 ft. of 8 and 12-in. for water system, in connection with expansion program. Financing for \$82,000 has been secured. V. H. Kasser is city engineer.

Standish, Mich., plans pipe line for water supply extensions, including replacements in present mains. Financing for \$52,000 has been authorized. Bruce Buchanan, Inc., Pontiac Bank Building, Pontiac, Mich., is consulting engineer.

Tacoma, Wash., has awarded 100 tons to American Cast Iron Pipe Co.

Redwood City, Cal., will take bids Dec. 4 on 129 tons of 8-in.

Fallon, Nev., has completed plans for 259 tons of 10-in.

Eureka, Cal., will vote on bonds Dec. 19 for improvement of water system requiring approximately 5254 tons.

Yakima, Wash., has taken bids on 100 tons.

Canadian Steel Output Advanced 25 Per Cent

PRODUCTION of steel ingots and castings in Canada advanced 25 per cent during October to a total of 48,496 tons. Output in the previous month was 38,630 tons, and 17,102 tons in October, 1932. The increase over September was entirely in steel ingots.

October pig iron production totalled 27,002 tons, as compared with 30,738 tons in the previous month, and 6731 in October, 1932.



CONSISTENT specification of Wyckoff Cold Drawn Bars will assure you of bar stock that is absolutely uniform, unvarying in cross section and readily machinable. Such precision and perfection are obtainable only with COLD DRAWN STEEL BARS, as produced by the Wyckoff organization.

As the largest exclusive manufacturer of Cold Drawn Steels, we are in a position to show how you may effect many worth-while economies in the selection of YOUR steel. Let us cooperate with you.

WYCKOFF DRAWN STEEL COMPANY

GENERAL OFFICES—Ambridge, Penna.
MILLS—Ambridge, Penna. and Chicago, Ill.

Consumer Disinterest in Copper, Lead and Zinc Prevents Price Strengthening

Straits Tin Selling in All Positions at Prices Ranging From 55c. to 53c. a lb., New York—Ore Restriction Firms Spelter

NEW YORK, Nov. 28.—Electrolytic copper developed weakness during the past seven-day period as shaded outside offerings appeared and general easiness ruled in commodity cash and futures. Sterling strength and increasing inflationary sentiment, however, resulted in a stronger market position today. Domestic trading is currently quiet, and bookings of prompt and full first quarter electrolytic totaled about 1500 tons last week. Custom smelters consider the market moderately steady at 8.25c. a lb., Connecticut valley, and mine producers are still inactive at a nominal price position of 9c. a lb. There may be some potential tonnage at 8c., but the uncertain market position and gyrations of currencies are discouraging forceful action on the part of custom smelters. The general unwillingness of consumers to transfer cash into commodities is indicative of confidence in dollar values, but recent developments may weaken that con-

fidence. No information regarding code developments is available to the trade, but it is indicated that Governmental pressure will necessitate an early agreement between custom and mine operators. The allocation of sales of custom smelters to fabricators is expected to be revised downward. Sales abroad continue in good volume to consumers and dealers at cent prices ranging from 7.75c. to 7.85c. a lb., c.i.f. Continental ports. Higher prices developed today as sterling quotations again strengthened

Tin

The irregular rallying of the dollar forced down Straits quotations from 55.75c. to 52.50c. a lb., during the week, but New York prices rebounded to 53.25c. today as sterling advanced to \$5.16¼. Consumer interest continues to expand here, and fair tonnages of all grades are being booked daily for all positions. Market transactions are hampered but not discour-

aged by the rapid and unpredictable exchange gyrations which occur during the trading period. American buyers continue to drain refined grades from England, and the profitable liquidation of released pool stocks abroad has partially served to weaken London values. London quotations dropped approximately £2 during the week, and first call postings today were £225 12s. 6d. for spot and future standard, and £231 for the Singapore market.

Aluminum

The market for new No. 12 is nominally established at 22c. a lb., delivered, but limited offerings are available at from 18c. to 20c. a lb. Trading in remelt No. 12 alloy is uninteresting and insufficient in volume to establish a market price. Carlots are considered weak at 12.50c. a lb., delivered, and bids of 12c. are being favorably received in several directions.

Zinc

Trading in spelter is quiet, but selling sentiment favors higher price levels, and the market undertone is strengthened as ore production declines. The reduced activity of fabricators and the current monetary uncertainty are encouraging consumers to defer purchases. Also, buyers are delaying shipments in order to improve their cash position at the end of the year. Most producers have fair bookings and are not inclined to force metal on the market. The price position of Prime Western is considered very firm at an unchanged level of 4.50c. a lb., East St. Louis, and 4.85c., New York. Sales last week dropped to 1600 tons at 4.50c. a lb. and about 100 tons of February metal at 4.55c. Most first hands are showing reserve in offerings of futures as a higher price for ore replacements impends. Tri-State production dropped from 7000 tons to 2000 tons last week as about 22 mills suspended production until Dec. 4. Shipments totaled 3650 tons, and about 3150 tons of Joplin concentrates was sold at a fairly firm price of \$30 a ton.

Lead

Aggregate sales during the seven-day period sufficed to more than move ore intakes. December requirements are about 35 per cent covered. Current activity is confined mostly to November and early December positions, at prices which are steady but not particularly firm at 4.15c. a lb., St. Louis, and 4.30c., New York. January books are nominally open, but there is no call for that position. Sellers expect considerable additional December buying to develop, but the approaching inventory period is expected to result in a reduction in December shipments as compared with preceding months. If buyers become convinced that serious domestic inflation impends, spirited buying of lead futures will undoubtedly ensue.

The Week's Prices. Cents Per Pound for Early Delivery

| | Nov. 22 | Nov. 23 | Nov. 24 | Nov. 25 | Nov. 27 | Nov. 28 |
|-----------------------------|---------|---------|---------|---------|---------|---------|
| Electrolytic copper, N. Y.* | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 |
| Lake copper, New York | 8.25 | 8.25 | 8.25 | 8.25 | 8.25 | 8.25 |
| Straits tin, Spot, N. Y. | 55.75 | 54.00 | 53.90 | 52.50 | 52.50 | 53.25 |
| Zinc, East St. Louis | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 | 4.50 |
| Zinc, New York | 4.85 | 4.85 | 4.85 | 4.85 | 4.85 | 4.85 |
| Lead, St. Louis | 4.15 | 4.15 | 4.15 | 4.15 | 4.15 | 4.15 |
| Lead, New York | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 |

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, 98-99 per cent, 22.90c. a lb., delivered; New No. 12, 18.50c. a lb., delivered. Aluminum, remelt No. 12 (alloy), carload lots delivered, 12c. a lb., average for week. Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered. Antimony, 7.25c. a lb., New York. Brass ingots, 85-5-5-5, 8.50c. a lb., New York and Philadelphia.

From New York Warehouse

| Delivered Prices, Base per Lb. | |
|---|--------------------|
| Tin, Straits pig | 55.00c. to 56.00c. |
| Tin, bar | 57.00c. to 58.00c. |
| Copper, Lake | 9.25c. to 10.00c. |
| Copper, electrolytic | 9.00c. to 9.50c. |
| Copper, castings | 8.75c. to 9.75c. |
| *Copper sheets, hot-rolled | 17.12½c. |
| *High brass sheets | 14.75c. |
| *Seamless brass tubes | 16.37½c. |
| *Seamless copper tubes | 16.62½c. |
| *Brass rods | 12.25c. |
| Zinc, slabs | 6.00c. to 7.00c. |
| Zinc sheets (No. 9), casks | 9.75c. to 10.00c. |
| Lead, American pig | 5.12½c. to 6.12½c. |
| Lead, bar | 6.12½c. to 7.12½c. |
| Lead, sheets | 8.00c. |
| Antimony, Asiatic | 8.50c. to 9.50c. |
| Alum., virgin, 99 per cent plus | 23.30c. |
| Alum., No. 1 for remelting, 98 to 99 per cent | 18.00c. to 19.00c. |
| Solder, ½ and ½ | 31.00c. to 32.00c. |
| Babbitt metal, commercial grade | 25.00c. to 60.00c. |

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

| Delivered Prices per Lb. | |
|--------------------------|---------|
| Tin, Straits pig | 55.75c. |
| Tin, bar | 57.75c. |

| | |
|-----------------------------|-------------------|
| Copper, Lake | 9.25c. to 9.375c. |
| Copper, electrolytic | 9.25c. to 9.375c. |
| Copper, castings | 9.25c. |
| Zinc, slab | 5.75c. to 6.00c. |
| Lead, American pig | 5.00c. to 5.25c. |
| Lead, bar | 8.00c. |
| Antimony, Asiatic | 9.00c. |
| Babbitt metal, medium grade | 19.75c. |
| Babbitt metal, high grade | 60.50c. |
| Solder, ½ and ½ | 32.50c. |

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

| | Dealers' Buying Prices | Dealers' Selling Prices |
|-------------------------------------|------------------------|-------------------------|
| Copper, hvy. crucible | 6.25c. | 7.25c. |
| Copper, hvy. and wire | 6.00c. | 7.00c. |
| Copper, light and bottoms | 5.00c. | 5.75c. |
| Brass, heavy | 3.50c. | 4.00c. |
| Brass, light | 3.00c. | 3.50c. |
| Hvy. machine composition | 4.50c. | 5.125c. |
| No. 1 yel. brass turnings | 4.25c. | 5.00c. |
| No. 1 red brass or compos. turnings | 4.00c. | 4.75c. |
| Lead, heavy | 3.25c. | 3.75c. |
| Zinc | 2.50c. | 3.00c. |
| Cast aluminum | 7.25c. | 8.50c. |
| Sheet aluminum | 11.25c. | 12.75c. |

Fabricated Structural Steel

Awards Higher—New Projects Decline

STRUCTURAL steel bookings at 12,550 tons compare with 9000 tons last week and 35,825 tons two weeks ago. Contracts in November, at 80,875 tons, were the largest for any month since May and compare with 55,900 tons in October and with 33,750 tons in September. Awards follow:

NORTH ATLANTIC STATES

Cambridge, Mass., 350 tons, post office, to New England Structural Co.

Springfield, Mass., 530 tons, technical high school, to G. Haarmann & Co., Inc.

Georgetown, Mass., 200 tons, bridge, to Pittsburgh-Des Moines Steel Co.

Avon, N. Y., 440 tons, State highway bridge, to McClintic-Marshall Corp.

Broome County, N. Y., 135 tons, State highway bridge, to American Bridge Co.

SOUTH AND SOUTHWEST

Owensboro, Ky., 300 tons, dam, to American Car & Foundry Co.

Old Hickory, Tenn., 690 tons, E. I. du Pont de Nemours & Co., Inc., plant addition, to Ingalls Iron Works.

Durham, N. C., 115 tons, municipal sewage plant, to Belmont Iron Works.

Barksdale Field, Shreveport, La., 1275 tons, airplane hangars, to Ingalls Iron Works.

Ellis-Kaufman Counties, Tex., 440 tons, bridge, to Petroleum Iron Works.

Parker County, Tex., 370 tons, bridge, to Houston Structural Steel Co.

Stonewall County, Tex., 355 tons, bridge, to North Texas Iron & Steel Co.

Missouri Pacific Railroad, 400 tons, bridge at Rio Vista, Ark., to American Bridge Co.

CENTRAL STATES

Columbus, Ohio, 179 tons, two dormitories for State School for Blind, to an unnamed fabricator.

Stark County, Ohio, 140 tons, bridge, to Berger Iron Works.

Belleplaine, Minn., 385 tons, bridge, to Minneapolis-Moline Power Implement Co.

Dresbach, Minn., 1100 tons, dam across Mississippi River, to Duffin Iron Works; also 2500 tons of sheet piling to Inland Steel Co.

Trempealeau, Wis., 2500 tons of sheet piling for dam, to Carnegie Steel Co.

La Crosse, Wis., 200 tons, brewery, to Worden-Allen Co.

Chicago, 200 tons, brewery, to Graver Tank & Mfg. Corp.

Chicago Heights, Ill., 150 tons, brewery, to Graver Tank & Mfg. Corp.

Leavenworth, Kan., 125 tons, penitentiary building, to Gate City Iron Works, Omaha, Neb.

WESTERN STATES

State of Colorado, 222 tons, highway structures in three counties, to unnamed bidders.

Arapahoe County, Colo., 143 tons, State highway structure, to an unnamed bidder.

Boulder Dam, 600 tons, cranes, to Harnischfeger Corp.

Boulder Dam, 3100 tons, trash racks, to Ingalls, Iron Works Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Mattapan, Mass., 100 tons, State hospital employees' building.

Northampton, Mass., 175 tons, State hospital power house.

New York, 13,000 tons, towers for Triborough bridge; Taylor-Fichter Steel Corp., general contractor.

Ellis Island, N. Y., 200 tons, sea wall.

Erie County, N. Y., 200 tons, State highway bridge; bids Dec. 5.

Erie County, N. Y., 700 tons, county bridges; bids taken Nov. 28.

College Park, Md., 225 tons, arts and science building, University of Maryland.

Washington, 500 tons, class room building for Howard University.

SOUTH AND SOUTHWEST

State of Georgia, 900 tons, five highway bridges.

Mohave County, Ariz., 160 tons, State highway work; bids Dec. 13.

CENTRAL STATES

Alton, Ill., 3145 tons sheet piling for twin locks in Mississippi River; bids to be opened by United States Engineer, St. Louis, Dec. 19.

Alton, Ill., 2120 tons, twin locks in Mississippi River; bids to be opened by United States Engineer, St. Louis, Dec. 19.

Quincy, Ill., 900 tons, Government lock and dam; Joseph Meltzer Co., New York, low bidder on general contract.

Madison County, Ill., 160 tons, bridge.

Chicago, 400 tons, State package freight terminal on Illinois waterway.

State of Indiana, 1100 tons, highway bridges.

Greenville, Mich., 230 tons, State highway bridge.

West Allis, Wis., 160 tons, subway.

Wisconsin, Wis., 190 tons, subway.

Iowa City, Iowa, 210 tons, Fine Arts building, University of Iowa.

Clinton, Iowa, 200 tons, high school building.

WESTERN STATES

Park County, Mont., 234 tons, State bridge over Yellowstone River; bids under advisement.

Dishman, Wash., 360 tons, State highway bridge.

Spokane, Wash., 364 tons, State undercrossing; bids under advisement.

Coos County, Ore., 114 tons, State bridge over Coquille River; bids Dec. 7.

Jackson County, Ore., 145 tons, State bridge over Applegate River; bids Dec. 7.

State of Oregon, 113 tons, State bridges in nine counties; bids Dec. 7.

San Francisco, 4000 tons, Federal building; Great Lakes Construction Co., general contractor.

Hamilton Field, Cal., 2700 tons, three hangars; Robert E. McKee, general contractor.

HAWAII

Pearl Harbor, 100 tons, facilities building at Navy Yard; bids under advisement.

CANAL ZONE

Albrook Field, 420 tons, hangars and operations buildings; bids Dec. 12.

FABRICATED PLATES

AWARDS

Durham, N. C., 195 tons, gas holder, to Chicago Bridge & Iron Works.

Battle Creek, Mich., 140 tons, small tanks, to Pfaulder Co.

Corpus Christi, Tex., 180 tons, welded pipe for Midwest Piping & Supply Co., to Western Metal Mfg. Co.

Boulder Dam, 750 tons, eight drum gates, to Consolidated Steel Corp.

Longview, Wash., 100 tons, two retorts, to Steel Tank & Pipe Co.

Puget Sound, Wash., 340 tons, patrol boats, to Union Drydock & Machine Works.

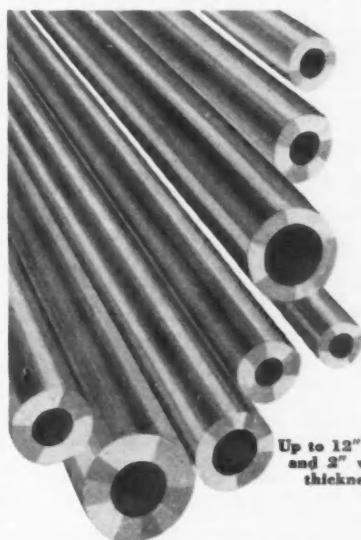
Seattle, 150 tons, improvement on Fifteenth Avenue Southwest, to Puget Sound Machinery

CANAL ZONE

Panama Canal, 386 tons, Specification No. 2913, to Central Iron & Steel Co. Depot.

NEW PROJECTS

Galion, Ohio, 400,000 gal. elevated water tank; bids Dec. 9.



TOOL STEEL TUBING

NON-SHRINK
OIL HARDENING
NON-DEFORMING

for RING DIES
CUTTING DIES
SPACERS, BUSHINGS, Etc.

Manufacturers of BISCO Tungsten Carbide and Tantalum Carbide drawing dies for wire, rod and tubing.

THE BISSETT STEEL CO., INC.

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PLANT EXPANSION AND EQUIPMENT BUYING

◀ NEW ENGLAND ▶

Board of Education, Hamden, Conn., plans manual training units in new high school group, for which bids will soon be asked on general contract. One-story machine and mechanical shop will be built. Cost \$700,000. Federal loan has been secured. R. W. Foote, New Haven, Conn., is architect.

Board of Selectmen, Sudbury, Mass., plans installation of pumping machinery and auxiliary equipment for water supply system. Cost about \$100,000. Fay, Spofford & Thorndike, 44 School Street, Boston, are architects.

Sub-Cal-Gun Corp., Boston, has been organized by George F. Bemis, 75 Federal Street and associates, to manufacture firearms, guns, etc.

Town Board of Selectmen, Framingham, Mass., is considering new hangar, 80 x 90 ft., with shop and repair facilities, at Framingham Airport. Cost about \$25,000 with equipment. R. C. Codman, manager of airport, is active in project.

Atwood-Oris Mfg. Co., Thomaston, Conn., has been organized by Gordon E. Atwood, Litchfield, Conn., and Joseph L. Oris, Thomaston, capital \$50,000, to manufacture metal products.

Town Board of Selectmen, Winthrop, Mass., plans electric-operated pumping plant for new sanitary sewerage system. Entire project will cost about \$90,000. Whitman & Howard, 89 Broad Street, Boston, are consulting engineers. Financing is being arranged.

◀ NORTH ATLANTIC ▶

Superintendent of Lighthouses, St. George, Staten Island, N. Y., asks bids until Dec. 7 for two oil engine-driven, 25-kw. generating sets.

Distilled Liquors Corp., 265 Greenwich Street, New York, recently organized as an interest of W. H. Hildick Corp., Flemington, N. J., has begun superstructure for new distillery at last noted place, recently referred to, and will build two main units, 93 x 125 ft. and 50 x 70 ft., with power house, instead of one structure, as previously announced. Plans are under way for a third building, work to begin on completion of initial units. Cost over \$100,000 with equipment.

Union Wire Die Corp., 333 West Fifty-second Street, New York, has leased floor in building at 475 Tenth Avenue, and will remove present works to that location.

Becker-Lynch, Inc., New York, has been organized by William I. Musso, 522 Ninth Street, Brooklyn, and associates, to manufacture ornamental metal products. Company will take over Becker-Lynch Co., 547 West Twenty-first Street.

Construction Service, Veterans' Administration, Washington, asks bids until Dec. 19 for boiler plant equipment, new steam and hot water heating boilers, fuel oil-burning equipment, storage tank, etc., for institution in Bronx, N. Y.

John Eichler Brewing Co., 3582 Third Avenue, New York, has let general contract to Huebener-Escher Co., 748 Melrose Avenue, for extensions and improvements. Cost about \$175,000 with equipment.

Baltimore Club Distilleries, Inc., New York, recently organized, has leased building at 413 Greenwich Street, and will improve for new storage and distributing plant.

Huntington Aero Instrument Co., Inc., New York, has been organized by Archer S. Huntington, 146 East Forty-ninth Street, and Harry J. N. Hastings, 3 East Sixty-third Street, to manufacture aeronautical precision instruments.

National Beer & Wine Importers, Inc., 551 Fifth Avenue, New York, Otto B. Shulhof, president, is planning stock issue of \$2,500,000, part of proceeds to be used for expansion in manufacture of alcoholic beverages, bottling and distribution.

Albany Metal Products Co., Inc., Albany, N. Y., has been organized by Walter D. Maring, 397 State Street, and J. Joseph

Mandlebaum, 18 Rosemont Street, to manufacture metal goods.

Board of Education, Newton, N. J., plans manual training equipment in new three-story and basement junior high school. Cost \$300,000. Financing is being arranged. Hacker & Hacker, 201 Main Street, Fort Lee, N. J., are architects.

Hygrade Food Products Corp., 30 Church Street, New York, has acquired controlling interest in A. Fink & Sons, Newark, N. J., meat packers, with plant on 3-acre tract at 810 Frelinghuysen Avenue. Expansion will be carried out, to include new equipment for packing, conveying, loading, etc.

J. L. Hammett Co., 380 Jelliff Avenue, Newark, manufacturer of school supplies and equipment, has leased two-story factory at 101-3 Peddie Street, about 10,000 sq. ft. floor space, for new plant.

New Jersey Micronizing Co., Camden, N. J., has been organized by Arthur B. Carpenter and A. M. Stackhouse, 1200 West Jersey Trust Building, to manufacture machinery and parts.

Colgate-Palmolive-Peet Co., 105 Hudson Street, Jersey City, N. J., manufacturer of soaps and kindred products, has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for two-story top addition to present eight-story plant, including improvements in present structure. Cost about \$175,000. J. A. Jacobs, address noted, is company engineer.

John A. Roebling's Sons Co., Roebling, Trenton, N. J., manufacturer of wire rope, cables, etc., is considering new Pacific Coast plant near San Francisco in Marin County. Cost over \$250,000 with equipment. San Francisco offices of company are 646 Folsom Street.

Penn Screw & Machine Works, 712 Cherry Street, Philadelphia, has leased floor in factory at Thirteenth and Hamilton Streets for new plant.

Martin Speer, 2047 East Susquehanna Avenue, Philadelphia, operating an automobile parts and repair works, has leased two-story factory at Amber and Dauphin Streets, 6150 sq. ft. floor space, for new plant.

Board of Water Commissioners, Sixteenth and King Streets, Wilmington, Del., plans installation of pumping machinery and auxiliary equipment for extensions in municipal waterworks. Cost about \$290,000. Federal grant of \$72,000 has been secured for initial work.

American Oxygen Service Corp., Harrison, N. J., is erecting an addition to its local works, 66 x 92 ft., one and two stories, with power plant, to cost \$80,000, including equipment. Adams & Gustafson are general contractors. Machinery and power plant contracts have been closed.

◀ BUFFALO DISTRICT ▶

Chautauqua and Erie Grape Growers' Cooperative Association grape juice manufacturing plant, Brocton, N. Y., has been acquired by new interests, headed by K. Schneider and associates, for about \$450,000. Plans are under way for remodeling for new distillery, with installation of equipment. Cost over \$75,000 with machinery.

Frostholm Machine & Tool Corp., Syracuse, N. Y., has been organized by John H. and Carl C. Frostholm, 116 Court Terrace, to manufacture machine tools and parts. New organization will take over Frostholm Brothers, 1009 South Clinton Street, manufacturers of similar products.

Brockway Motor Co., Cortland, N. Y., manufacturer of gasoline motor trucks, has developed a new electric-operated motor truck, and will establish division for such production, with models of new truck units having parts interchangeable with company gasoline trucks. Both parts production and assembling will be concentrated at Cortland works. New division will be headed by Hugh Porman.

Garden City Paper Mills Co., Ltd., St. Catharines, Ont., plans rebuilding paper converting mill near Merritt, Ont., recently destroyed by fire. Loss about \$100,000 with equipment.

◀ WESTERN PENNA. ▶

Allegheny River Mining Co., Kittanning, Pa., plans new all-steel tippie at Chickasaw coal mining properties, about 30 miles from city. Cost about \$85,000 with machinery.

Penn Charcoal & Chemical Co., Smethport, Pa., R. W. Hilton, head, has acquired plant of Tloga Wood Products Co., Morris, Pa., idle for several years, and will remodel for manufacture of wood alcohol, acetate of lime, and other wood-chemical products.

Davison Coke & Iron Co., Oliver Building, Pittsburgh, plans construction of new steel derrick, stiff leg type, at plant at Neville Island.

United States Engineer Office, Pittsburgh, asks bids until Dec. 12 for construction of Montgomery dam on Ohio River, between Beaver and Midland, Pa., including steel spillway gates, machinery, castings, electrical equipment, etc.

◀ SOUTH ATLANTIC ▶

Swift & Co., Union Stock Yards, Chicago, meat packers, have asked bids on general contract for extensions and improvements in three-story and basement branch plant at Savannah, Ga. Cost over \$40,000 with equipment.

American Enka Corp., Enka, near Asheville, N. C., manufacturer of cellulose rayon products, has let general contract to Potter & Shackelford, Inc., Greenville, S. C., for addition. Cost about \$85,000 exclusive of equipment. Other mill units will be erected later, in connection with expansion and improvements to cost over \$850,000 with machinery. Power house addition will be built. Headquarters are at 271 Church Street, New York.

Traffic Marking Machine Co., Raleigh, N. C., has been organized by J. M. Thompson and W. B. Drake, Raleigh, to manufacture mechanical devices and equipment for street-marking service.

City Council, Greenwood, S. C., plans new pumping plant for extensions and improvements in water supply system. Financing for \$200,000 has been arranged for entire project.

Excel Machine Co., Gastonia, N. C., has been organized by W. C. Stewart, Gastonia, and associates, capital \$50,000, to manufacture machinery and parts.

◀ OHIO AND INDIANA ▶

Brown Fence & Wire Co., 6532 Juniata Avenue, Cleveland, manufacturer of wire fencing, etc., has let general contract to Tepper & Limovitz, 3468 East 123rd Street, for one-story plant addition, 80 x 128 ft., for storage and distribution. Cost about \$25,000 with equipment.

Board of Control, Dover, Ohio, asks bids until Dec. 5 for extensions and improvements in municipal electric light and power plant, including new 2000-kw. turbo-generator unit and auxiliary equipment. Appropriation of \$105,000 is available.

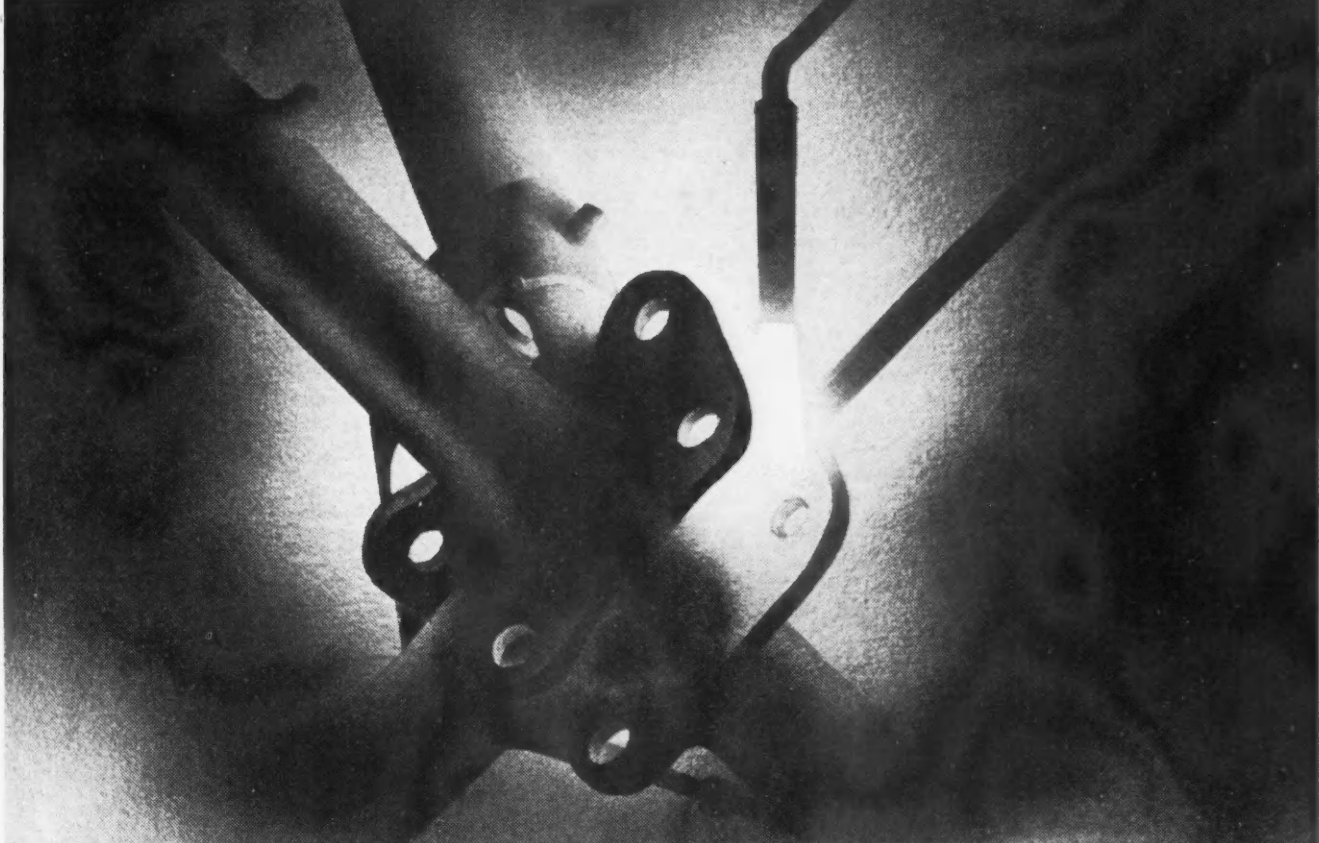
Ironton By-Product Coke Co., Ironton, Ohio, plans new dock and conveyor system for handling coal and coke from river boats to plant, with steel towers for conveyor unit. Headquarters are at 61 Broadway, New York.

Palmer Distillery Co., Worthington, Ohio, care of J. C. Palmer, 160 Granville Road, president, recently organized, plans new distilling plant of several units, with power house, machine shop and other departments. Cost about \$200,000 with equipment.

Department of Public Service, Shelby, Ohio, plans extensions and improvements in municipal electric light and power plant, to include new generating unit, making third generator at station, and auxiliary power equipment. Cost about \$200,000. Financing is being arranged. Froelich & Emery, Second National Bank Building, Toledo, Ohio, are consulting engineers.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until Dec. 5 for 25 oil temperature regulator assemblies and four fuel coolers (Circular 150).

MOLY



makes steel easier to weld

MOLYBDENUM is practically the only alloy used in steel which does not interfere with welding. In airplane construction, where strength and light weight are of paramount importance, welding and Moly steels have gone hand in hand. The welds have proved tougher and stronger, with less embrittlement of surrounding areas. Indeed, Moly is often used in the coatings of welding rods to improve the quality of the weld.

In the well-known 18 and 8 stainless steel, now attracting the attention of engineers, Moly additions of about 2% to 4% are being used to increase desirable characteristics, particularly resistance to acid

corrosion. It is interesting to note that a Molybdenized stainless steel does not require the usual surface polish to resist corrosion.

Moly always improves steel. Increases tensile strength, creep strength and resistance to wear. Gives a superior steel at a "competitive" initial price and a lower cost for the finished product. The modern Climax laboratories in Detroit and the Climax metallurgists are prepared to prove these points. Write for details about our free engineering and experimental services and an interesting new book: "Molybdenum." Climax Molybdenum Co., 295 Madison Avenue, New York City.

CLIMAX Mo-lyb-den-um

Cincinnati Lumber Exchange, Inc., Cincinnati, plans new narrow gage logging tramway between Ohio River bank and mill near mouth of Mill Creek, for conveying lumber from barges to plant.

United Oil Equipment Co., Cleveland, has been organized by Milton and Herman Seckel, to manufacture oil-measuring, distribution and kindred equipment. New company will take over organization of similar name at 4517 Broadway.

Belmont Brewing Co., Martins Ferry, Ohio, affiliated with Distillers & Brewers Corp. of America, Inc., 21 West Street, New York, is carrying out expansion and improvements, including new equipment. Plans are under way for new storage and distributing building. Cost over \$85,000 with equipment.

Town Council, Fortville, Ind., plans municipal electric light and power plant. Cost about \$65,000. Financing will soon be arranged.

Board of Public Works, Hammond, Ind., plans installation of pumping and auxiliary machinery, digesters, conveyors, loaders and other equipment for new sewage disposal works and treatment plant. Project ordered by State Board of Health. Cost about \$1,000,000 with machinery. Financing will be arranged.

◀ SOUTH CENTRAL ▶

Wright & Taylor Distilling Corp., Louisville, has arranged for stock sale totaling about \$650,000, considerable part of proceeds to be used for expansion, including new multi-unit distillery. Cost about \$475,000 with equipment. Ford, Bacon & Davis, Inc., 39 Broadway, New York, is engineer.

Common Council, Moss Point, Miss., plans purchase of water meters and other equipment for water system. Cost about \$50,000. Financing is being arranged.

Common Council, Shelbyville, Ky., plans new municipal electric light and power plant. Bonds for \$125,000 have been approved.

John A. Walther Distilling Co., Lebanon, Ky., recently organized by John A. Walther, Lebanon, and associates, has acquired a former distillery at West Lebanon, buildings on 5-acre tract. Plant will be remodeled and new equipment installed. Cost over \$50,000 with machinery. William Hayden will be in charge of production.

Common Council, Jennings, La., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for municipal water and sewerage systems. Cost \$150,000. Financing is under way.

◀ MIDDLE WEST ▶

Paul Gerhardt, 64 West Randolph Street, Chicago, architect, will draw plans for two or more distilling plants, each to consist of several units, with power houses and other mechanical departments, for new company being organized. Each plant will cost about \$200,000 with equipment. Sites are being selected at LaSalle, Peru, Ottawa and Spring Valley, Ill.

City Council, Aurora, Ill., plans new municipal refuse incinerator plant, with furnaces, conveyors, loaders and other equipment. Cost about \$90,000 with machinery. Financing is being arranged.

United Brewing Co., Gilmer, Ill., has asked bids on general contract for three-story addition, 60 x 150 ft., including improvements in present plant. Cost over \$80,000 with equipment. Herman J. Gaul, 228 East Superior Street, Chicago, is architect.

Loup River Public Power District, Columbus, Neb., C. B. Fricke, president, has secured Federal loan of \$7,300,000 for hydroelectric power and irrigation project on Loup River, with generating station near Columbus. Program includes transmission lines, power substations and distributing system. Work will begin soon. Fred Albert, Columbus, and George E. Johnson, Lincoln, Neb., are engineers.

Common Council, Lamoni, Iowa, plans municipal electric light and power plant with Diesel engine-generating units. Cost about \$100,000 with equipment. Bond issue will be arranged. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Hiram Walker & Sons, Inc., Peoria, Ill., has been organized, capital \$3,000,000, as an interest of Hiram-Walker-Gooderham & Worts, Ltd., Walkerville, Ont., distiller, and will take over company of same name formed as a subsidiary a few months ago. New company will erect distilleries in United States with

initial investment of about \$4,000,000. Initial plant will be at Peoria, where work has begun on multi-unit distillery. Sites are now being considered for other distilleries. William J. Hume, head of parent company, is president of new organization.

City Commission, Devils Lake, N. D., plans new municipal electric light and power plant. Cost about \$400,000 with equipment. Election will be held to approve bonds in that amount. Burns & McDonnell Engineering Co., 107 Linwood Boulevard, Kansas City, Mo., are consulting engineers.

Independent School District No. 1, Breckenridge, Minn., plans manual training department in new two-story high school. Fund of \$200,000 has been arranged. Nairne W. Fisher, St. Marys Building, St. Cloud, Minn., is architect.

National Distilling Co., 325 North Twenty-seventh Street, Milwaukee, has acquired three-story warehouse building at 2011 North Thirtieth Street and will equip for manufacturing, rectifying and bottling liquor. Architect is Eugene R. Liebert, 1948 North Holton Street.

National Pressure Cooker Co., 1515 Ball Street, Eau Claire, Wis., has placed general contract with Olson & Walker, 304½ North Barstow Street, for two-story plant extension, 75 x 122 ft.

City Council, Fond du Lac, Wis., has authorized \$60,000 bond issue for erection of municipal sewage disposal plant, and \$28,000 for restoration of underground water system, requiring 10,000 ft. of cast iron pipe. G. H. Stanchfield is city engineer.

◀ WASHINGTON DISTRICT ▶

Board of Education, Alexandria, Va., T. C. Williams, superintendent of schools, plans manual training department in new three-story high school. Cost \$250,000. Raymond V. Long, State Board of Education, Richmond, Va., is architect.

Bureau of Ordnance, Navy Department, Washington, asks bids until Dec. 4 for gun barrel forgings and housing forgings (Advertisement 147); until Dec. 5, 180 tons armor (Advertisement 149); until Dec. 6, 45,850 common projectiles, 2150 illuminating projectiles and 100 drill projectiles (Advertisement 148).

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for additions to hangar No. 29 and relocating present hangar unit, marine barracks, flying field, Quantico, Va., including one-story lean-to on each side and four two-story corner bays, with pressed steel doors, steel windows, etc. (Specification 7082); until Dec. 6, for improvement of fuel oil facilities, naval fuel depot, Pearl Harbor, T. H. (Specification 7136).

Town Council, Culpeper, Va., has secured Federal grant and loan for \$170,000 for municipal electric light and power plant. Wiley & Wilson, Lynchburg, Va., are consulting engineers.

◀ SOUTHWEST ▶

Crescent Brewing Co., Joplin, Mo., care of T. E. Martinie, Zahn Building, architect, recently organized by Carl Meyers, Joplin, and associates, has plans for new five-story and basement brewery, 150 x 300 ft. Cost about \$100,000 with equipment.

Common Council, Lancaster, Mo., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for municipal water system. Cost over \$50,000. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

Jack Daniel Distilling Co., St. Louis, recently organized by L. Motlow and associates, has acquired property of Ames Shovel & Tool Co., Duncan Street, totaling 22,000 sq. ft. floor space, and will remodel for new distillery. Cost over \$50,000 with machinery.

City Council, Trenton, Mo., has been authorized at special election to arrange bond issue for \$250,000 for new municipal electric light and power plant, and distributing system. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer; W. E. Ralls is city engineer.

Revivo Battery & Signal Co., St. Louis, has been organized by Allen L. Snyder, 484 Lake Street, and associates, to manufacture signal equipment, electric battery equipment, etc.

City Council, Strong City, Kan., plans new municipal electric light and power plant, with Diesel engine-generating units. Cost \$40,000. Bond issue in such amount has been authorized.

E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

Common Council, Aransas Pass, Tex., plans installation of pumping machinery and other equipment, pipe lines, etc., for extensions and improvements in waterworks and sewerage systems. Financing for \$33,000 is being arranged. L. B. Griffith, Sherman Building, Corpus Christi, Tex., is engineer.

◀ MICHIGAN DISTRICT ▶

City Council, Menominee, Mich., has plans for new municipal electric light and power plant. Cost \$650,000 with equipment. Financing is being arranged. Francis Engineering Co., Saginaw, Mich., is consulting engineer.

Dunham-Moore Co., 17837 Dequindre Street, Detroit, manufacturer of farm machinery and parts, has purchased a factory at Carleton, Mich., and will remove to new location early in January. Improvements will be made.

Hydraulic Classifier & Concentrator Corp., Detroit, has been organized by Norman J. Urquhart, 25 East Bethune Avenue, and associates, to manufacture mining equipment and appliances.

Midland Steel Products Co., Detroit Pressed Steel Division, 6660 Mount Elliott Avenue, Detroit, has plans for three one-story additions, one 73 x 107 ft., and two 73 x 73 ft., and will carry out erection by day labor.

◀ PACIFIC COAST ▶

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Dec. 20 for hammerhead cranes for Mare Island, Cal., Navy Yard (Schedule 7540).

Board of City Trustees, Escondido, plans municipal electric light and power plant and electric distributing system. Cost \$260,000. Financing is being arranged. J. H. Chase, Civic Center Building, Los Angeles, is consulting engineer.

National Cable Co., Portland, Ore., H. J. Rich, president, recently organized to manufacture special non-corroding cables, has filed plans for one-story plant at 1339 Burnside Street, N. E. C. R. Cross, formerly connected with Union Oil Co., San Francisco, is vice-president and treasurer.

Vancouver Brewing Co., Vancouver, B. C., is planning establishment of new distillery at Seattle, where property will be leased and converted for service. Company is now operating a distilling plant at New Westminster, B. C., which will be removed to new location. Cost over \$100,000 with equipment.

American Distilling Corp., Seattle, recently organized, care of Carl J. Kiefer, Schmidt Building, Cincinnati, engineer, has plans for new distillery, bottling plant, storage and distributing plant, power house, machine shop and other units. Cost about \$400,000 with equipment. Engineer noted in charge.

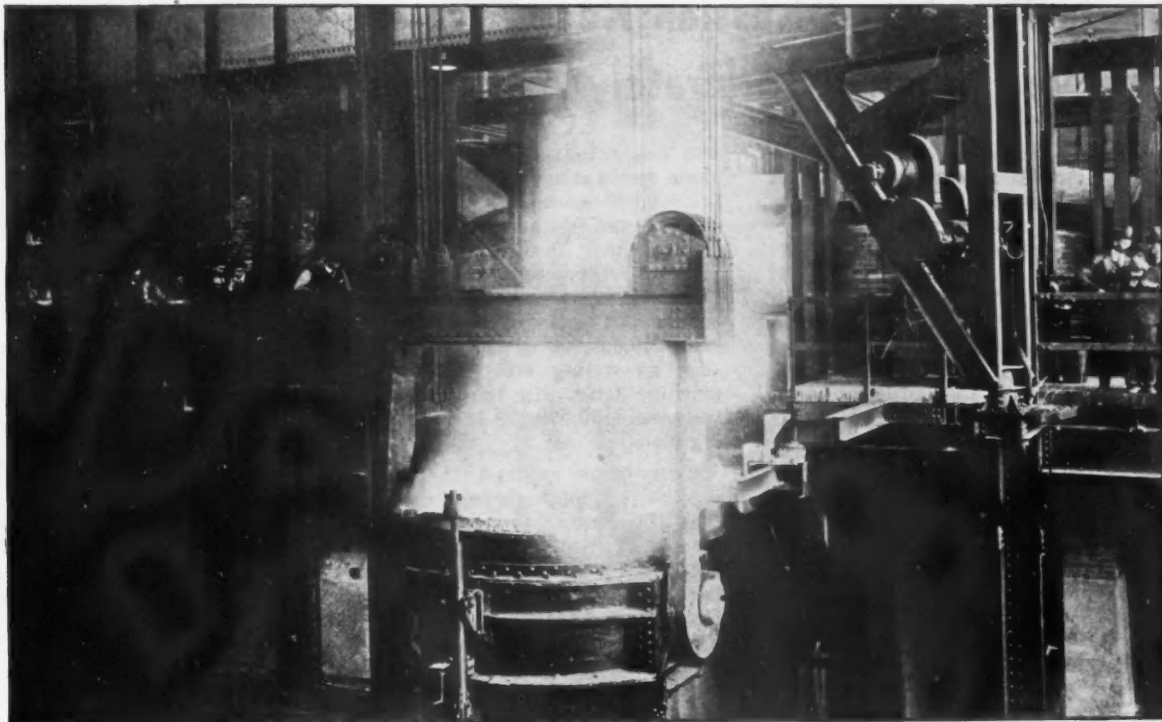
Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Dec. 5 for one motor-driven surface grinder (Schedule 1190), eight portable air compressors (Schedule 1173) for San Diego Navy Yard; 100,000 lb. rivet steel (Schedule 1154), power shovels and drag shovel attachments (Schedule 1185-R), 36,000 lb. pig lead (Schedule 1155) for Mare Island Navy Yard; one motor-driven rotary shear (Schedule 1171), one motor-driven grinder (Schedule 1172) for Puget Sound yard.

◀ FOREIGN ▶

Monterey Iron & Steel Works, Ltd., Monterey, State of Nuevo Leon, Mexico, has begun erection of addition for production of 2-in. and smaller galvanized pipe. Completion is scheduled in 60 to 90 days. Cost over \$60,000 with equipment.

Department of Communications, Government of China, Nanking, China, plans new airport on Whangpoo River, Shanghai, China, with hangars, repair and reconditioning shops, oil storage and distributing plant, dock facilities for seaplanes and other structures. Field will be known as China National Air Port-of-Entry and will cost about \$1,000,000 with equipment.

Kanagafuchi Spinning Co., Tokyo, Japan, plans new works for cellulose rayon production at Takaasago, Japan, where over 200 acres has been selected. Plant will include power house and other mechanical structures. Cost over \$750,000 with machinery.



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Chromium Metal Chromium-Copper
Miscellaneous Chromium Alloys

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Ferrosilicon 75% Ferrosilicon 80 to 85%
Refined Ferrosilicon 90 to 95%
Refined Silicon (minimum 97% Silicon)
Calcium Silicon
Calcium-Aluminum-Silicon
Calcium-Manganese-Silicon
Silicon-Copper Miscellaneous Silicon Alloys

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Medium-Carbon Ferromanganese
Manganese Metal Manganese-Copper
Miscellaneous Manganese Alloys

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All Grades including Silico-Spiegel

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Trade Results of Russian Recognition Believed to Be Moderately Exaggerated

WASHINGTON, Nov. 25.—Formal recognition of Soviet Russia by the United States Government is seen as opening the way for increased exports of American products to the former country. Among lines which it is hoped will see stimulated movement to Russia are railroad supplies, machinery and steel. However, it is the belief of careful students of the situation that many estimates of the export business to be gained are considerably overdrawn. In giving out the detailed terms under which the two Governments have resumed official relations, President Roosevelt made no prediction as to the volume of business that is expected to be developed between the two countries and made no mention of the credit or other arrangements that may have been determined upon. It is not known that such arrangements have as yet been made.

The statement of former Senator S. W. Brookhart, special adviser to the Agricultural Adjustment Administration, that Russian orders for American products to the value of \$520,000,000 are immediately available to the United States if this country will provide the necessary credits is held to be too optimistic. Mr. Brookhart has been negotiating for the Agricultural Adjustment Administration with the Amtorg Trading Corp. for the sale of surplus farm products

and has estimated that cotton sales alone would range from \$50,000,000 to \$60,000,000 annually, provided satisfactory credit is arranged, apparently through the Reconstruction Finance Corp. Other items included in the \$520,000,000 in orders which he said only await the extension of credits are \$400,000,000 of heavy machinery, such as rolling mill equipment and machine tools. In the total he also included \$100,000,000 in railroad rolling stock.

Those who contend these figures are entirely too high point to the fact that the largest purchases made by Russia of American goods were in 1930 with a total of \$111,362,000. Of this total, \$39,405,000 consisted of industrial machinery and \$41,903,000 of agricultural machinery. It is not believed that it will be possible to reach some of these totals again. To support this view, it is pointed out that Russia has largely completed construction of automotive and tractor plants and that as a result requirements in these lines will be less in the future. The largest movement of steel to Russia in the 1929-1932 period, according to a compilation by Grace Witherow, division of economic research, Bureau of Foreign and Domestic Commerce, was \$2,149,000 in 1930. All shipments from the United States to Russia since then have sharply declined, dropping to a

total of only \$21,466,000 in 1932. Imports into Russia from other countries also have fallen. Germany, chief supplier, saw its Russian trade drop to \$99,000,000 in the first six months of 1933 as compared with \$184,000,000 in the corresponding period of 1932. United Kingdom shipments dropped to \$18,000,000 in the first half of the current year as against \$52,000,000 in the corresponding period of last year. Much of the German and British shipments consist of machinery. The volume of Russian business done in the earlier years, when prices were higher, of course cannot be entirely comparative with the dollar volume of the present time when prices are down.

Five-Year Plan Had Results

The decline in Russian purchases the past two years is attributed partially to progress made by Russia in its five-year industrialization plan, thus drying up some markets from abroad. It is also attributed to the fact that Russia is suffering along with other nations of the world financially and is watching her credit position carefully. In this connection, it has been pointed out that, while trading with Russia rests a great deal upon credit arrangements, it also depends upon the willingness of Russia to accept credit. Soviet Russia has maintained a clean record from a point of credit and while there are those who have cautioned against the United States providing excessive credit the general feeling is that Russia is a good risk. For one thing Soviet Russia apparently wants to maintain this record as a means of

* Exports of Machinery, Steel and Other Important Items to Russia

[Total value of exports includes reexports of foreign merchandise; individual items include only United States products. Values in thousands of dollars]

| Commodity | Quantity | | | | Value | | | |
|--|----------|--------|--------|-------|--------|---------|---------|--------|
| | 1929 | 1930 | 1931 | 1932 | 1929 | 1930 | 1931 | 1932 |
| Exports ..... | ..... | ..... | ..... | ..... | 81,548 | 111,362 | 103,486 | 12,466 |
| Iron and steel mill products..... | ..... | ..... | ..... | ..... | 1,646 | 2,149 | 525 | 28 |
| Advanced manufactures of iron and steel..... | ..... | ..... | ..... | ..... | 560 | 1,157 | 459 | 56 |
| Ferroalloys, 1,000 lb..... | 19 | 65 | 1,129 | 136 | 30 | 46 | 458 | 50 |
| Copper and manufactures..... | ..... | ..... | ..... | ..... | 3,332 | 2,015 | 965 | ..... |
| Electrical machinery and apparatus..... | ..... | ..... | ..... | ..... | 2,412 | 4,821 | 6,656 | 2,100 |
| Electric generators and parts..... | ..... | ..... | ..... | ..... | 55 | 414 | 2,072 | 536 |
| Transforming and converting apparatus..... | ..... | ..... | ..... | ..... | 215 | 1,144 | 742 | 397 |
| Transmission and distribution apparatus..... | ..... | ..... | ..... | ..... | 404 | 932 | 965 | 112 |
| Motors, starters, controllers and parts..... | ..... | ..... | ..... | ..... | 529 | 1,254 | 1,558 | 903 |
| Industrial machinery..... | ..... | ..... | ..... | ..... | 14,037 | 39,405 | 38,941 | 5,903 |
| Steam engines and parts..... | ..... | ..... | ..... | ..... | 134 | 493 | 1,535 | 404 |
| Internal combustion engines and parts..... | ..... | ..... | ..... | ..... | 750 | 1,644 | 1,759 | 99 |
| Water wheels, water turbines, and parts..... | ..... | ..... | ..... | ..... | ..... | 605 | 1,406 | 370 |
| Ball and roller bearings and parts, 1,000 lb..... | 712 | 1,713 | 668 | ..... | 743 | 1,321 | 542 | 8 |
| Construction and conveying machinery..... | ..... | ..... | ..... | ..... | 1,707 | 3,701 | 3,668 | 154 |
| Mining and quarrying machinery..... | ..... | ..... | ..... | ..... | 1,216 | 2,258 | 2,303 | 202 |
| Well and refinery machinery..... | ..... | ..... | ..... | ..... | 2,501 | 8,162 | 1,860 | 486 |
| Metal-working machinery..... | ..... | ..... | ..... | ..... | 2,594 | 13,618 | 22,492 | 3,468 |
| Agricultural machinery and implements..... | ..... | ..... | ..... | ..... | 20,121 | 41,903 | 37,887 | 120 |
| Cultivating implements..... | ..... | ..... | ..... | ..... | 1,059 | 2,576 | 1,683 | 17 |
| Combines (reapers, threshers), number..... | 435 | 1,376 | 2,057 | ..... | 701 | 1,912 | 5,588 | ..... |
| Wheel tractors, number..... | 11,364 | 20,447 | 22,909 | 32 | 11,411 | 22,681 | 23,531 | 31 |
| Other tractors, parts and accessories..... | ..... | ..... | ..... | ..... | 5,949 | 13,074 | 5,806 | 63 |
| Motor trucks and buses, number..... | 1,824 | 1,864 | 1,233 | 7 | 1,004 | 1,435 | 1,107 | 1 |
| Passenger automobiles, number..... | 2,730 | 1,114 | 196 | 446 | 1,345 | 865 | 127 | 603 |
| Automobile parts and accessories, except engines..... | ..... | ..... | ..... | ..... | 849 | 3,445 | 10,338 | 2,089 |
| Engines for aircraft and aircraft parts and accessories..... | ..... | ..... | ..... | ..... | 207 | 542 | 507 | 407 |
| Internal combustion marine engines, except Diesel, number..... | 126 | 62 | 103 | ..... | 346 | 63 | 845 | ..... |
| Railroad freight cars, number..... | 20 | 12 | 93 | 2 | 62 | 62 | 552 | 46 |

*Taken from "Foreign Trade of United States, Calendar Year 1932," published by the Department of Commerce.

A NATION-WIDE RUST-PROOFING SERVICE . .



PARKERIZING SERVICE PLANTS

| | |
|--------------------------------------|---|
| BALTIMORE, MD. | Federal Tin Company, Inc. Parkerizing Dept. Charles and Barre Streets |
| BOSTON, MASS. | Rust-Proofing & Metal Finishing Corp. Commercial Ave. and Binney St. Cambridge A. |
| BUFFALO, N. Y. | Parker Rust-Proof Co. of Buffalo, Inc. 1095 Niagara St. |
| CANTON, OHIO | G. C. Reiter |
| CHICAGO, ILL. | Western Rust-Proof Co. 2139 Walnut St. |
| CINCINNATI, O. | The Stolle Corporation 227-241 W. McMicken |
| CLEVELAND, O. | Parker Rust-Proof Co. of Cleveland 2617 E. 76th St. |
| DAYTON, OHIO | Dayton Rust-Proofing Co. 736 N. Main St. |
| DETROIT, MICH. | 2177 East Milwaukee Ave. |
| EVANSVILLE, IND. | Evansville Plating Works |
| KANSAS CITY, MO. | Bar-Rusto Plating Corp. 1808 Locust Street |
| LOS ANGELES, CAL. | Los Angeles Rust-Proofing Company 8141 So. Alameda St. |
| LOUISVILLE, KY. | Republic Welding Co., Inc. 305 College St. |
| NEW YORK | Pyrene Manufacturing Co. 560 Belmont Ave., Newark, N. J. |
| PHILADELPHIA, PA. | Philadelphia Rust-Proof Co. 3229 Frankford Ave. |
| PITTSBURGH, PA. | Pittsburgh Electro Galvanizing Co. 5th St. and Penna. R. R., Sharpsburg |
| ROCKFORD, ILL. | Barber-Colman Company |
| ST. LOUIS, MO. | Mid-West Rust-Proof Co. 3665-7 Market St. |
| SAN FRANCISCO, CALIF. | Best & Company 2006 Clement Ave., Alameda |
| TORONTO, ONT. | Fairgrieve & Son 50 Dovercourt Road |
| TORRINGTON, CONN. | Turner & Seymour Company Parkerizing Department |
| WAYNESBORO, PA. | Landis Engineering & Mfg. Co., Inc. |
| Affiliated Foreign Companies: | |
| LONDON, ENGLAND | The Pyrene Company, Limited Great West Road, Brentford |
| PARIS, FRANCE | Societe Continentale Parker 42 Rue Chance-Milly, Clichy, (Seine) |
| FRANKFURT, GERMANY | Metallgesellschaft A. G. Bockenheimer Anlage 45 |
| SYDNEY, AUSTRALIA | Parkerizing, Bonderizing, Rust-Proofing, Ltd. Barrack House, 16 Barrack St. |
| TOKYO, JAPAN | Nihon Parkerizing Kabushiki Kaisha No. 6 Mitsubiski 12 Bldg. Marunouchi, Kojimachi-ku |

Parker literature summarizes the findings of the Parker research staff. It describes their more important findings in 17 years of research, supported by extensive practical experience in rust-proofing and finish improvement of iron and steel products in all industries. Copies will be sent on request to interested technical men and manufacturers.

PARKERIZING

EVERY manufacturer located in the industrial areas of the country is within a few hours of Parkerizing Jobbing Service.

For the manufacturer whose rust-proofing requirements may not be large or continuous, local service is available, making it convenient to provide the added protection and increased sales value of Parkerizing.

Every local service plant is completely equipped to handle the type of material produced in the surrounding territory, and the process will be applied by experts in finishing iron and steel by Parker Processes.

Competent finishing engineers in each plant are prepared to dig into metal finishing problems, and frequently are able to suggest economies in metal finishing operations.

Write your nearest service plant, or direct to

PARKER RUST-PROOF COMPANY
2186 East Milwaukee Avenue Detroit, Michigan

PARKER
RUST-PROOFING
processes
BONDERIZING
PARKERIZING



supporting the standing of her new form of government.

Trading, of course, will be based a great deal upon exchange of goods, for it is doubted that Russia will ship a great deal of gold. She is holding on to most of her gold. This is evidenced by the fact that Russia shipped only about \$100,000,000 in gold to Germany from 1931 through the middle of the present year. Important among Russian shipments to the United States are such products as manganese ore, the leading item of Russian imports in 1929, with total of 169,121 tons, valued at \$5,452,000. Other Russian goods imported in large volume, as shown by

the peak year of 1929, include sausage casings, fish, undressed fur, lumber, and pulpwood. Domestic manufacturers of competing goods, however, are protesting against letting down the bars to Russian imports.

It is believed that among the largest lines that Russia will take are railroad supplies, inasmuch as Russia has not done much as yet in its railroad building program.

Benefits of PWA Loans To Railroads to Be Felt in Repair Programs

WASHINGTON, Nov. 24.—Plans are being perfected by borrowing railroads, steel companies and other material manufacturers for getting men back to work immediately, according to a report made to Public Works Administrator Harold L. Ickes by Frank C. Wright, director of the recently created Transportation Loan Division of the PWA. He told the Public Works Administrator that progress has been made in discussions with railroad officials looking toward further loans from the PWA fund that will result in creating additional immediate employment and increased purchasing power in many localities.

By loaning money on security to railroads to be used for repairing locomotives and freight cars that have long been out of commission and awaiting repairs, Mr. Wright reported, many men can be moved off of relief rolls and onto payrolls immediately, and full time employment can be provided on justified work for many other men who have had only intermittent work for many months. The names of individual roads with which negotiations have been conducted to speed opening of repairs work were not announced and will not be, it was stated, until present progress results in definite allotments.

Mr. Wright told the Public Works Administrator that by deferring repairs that should have been made, the railroads have built up a large backlog of employment. Its size, he reported, is indicated by the fact that on Jan. 1, 1932, Class I carriers had only 6990 locomotives out of service and undergoing or awaiting repairs, while by July 1 of this year the number had increased to 11,203, or more than 22 per cent of all locomotives owned by Class I carriers. To replace locomotives taken out of service to await repairs the roads have drawn on the reserves of serviceable engines that are kept stored away to meet emergencies. On Jan. 1, 1932, it was stated, Class I roads had 10,982 engines in storage, but on Oct. 1 of this year that number had been cut to 5522. The total number of serviceable locomotives of Class I roads, both in

active use and in storage, declined from 46,657 on Jan. 1, 1932, to 39,299 on Oct. 1 of this year, according to reports of the American Railway Association. The report recalls that recently Federal Transportation Coordinator Joseph B. Eastman sent out questionnaires to railroad executives to make reports on retirement, replacement and repair needs of locomotives. Mr. Eastman has been active in promoting the use of PWA funds for railroad purchases and repairs.

Mr. Wright explained that a further indication of the size of the backlog of accumulated employment in railroad repair shops is the fact that the number of freight cars of all descriptions awaiting or undergoing heavy repairs increased from 61,287 on Jan. 1, 1932, to 231,768 on Aug. 1 of this year.

"Railroad shop activity has been picking up since midsummer, but the amount that individual roads have been able to spend on both current and deferred repairs has been limited by the revenues of each," Mr. Wright said. "Little money has been borrowed for that purpose. The necessity of maintaining within the limits of budgets that are governed from month to month by revenues is causing the closing down of many shops for a number of days each month at the time of year when earnings of employees should be largest.

"Monthly reports of the American Railway Association on the condition of locomotives and freight cars indicate that while current repair requirements are now being met, little has as yet been done to reduce the amount of equipment that has been stored for repair. Between Aug. 1 and Oct. 1 the number of freight cars awaiting heavy repairs was cut only 3491 from 231,768 to 228,277.

"Between July 1 and Oct. 1, the number of locomotives awaiting or undergoing repairs was cut by only 468, from 11,203 to 10,735. That many more engines should have been put into running order during those three months is indicated by the fact that to meet the demands of increased traffic, the Class I roads were forced to take 1220 serviceable engines out of storage and put them to work. This left the Class I roads on Oct. 1 with only 5522 serviceable engines in storage for use when needed."

Pointing to application of funds for railroad repair work, in contrast to unavoidable delays on construction projects, Mr. Wright indicated the effect that the allotment of \$135,000,000 to railroads to be used for electrification work and for the purchase of rails and rail fastenings, and 7000 freight cars will have on employment. The electrification work referred to is that between Wilmington, Del., and Washington on the Pennsylvania which, by borrowing \$84,000,000, will also purchase the freight cars mentioned.



Users of PERKINS GEARS Know Gear Values

PERKINS Gears give users the accuracy, quality, and dependability so necessary in successful gear performance.

Perkins Gears are produced by gear specialists . . . on specially designed equipment. They are "mirror finished" by a special polishing operation. Each gear is made to conform to Perkins Super Standards of Quality.

Order Perkins Gears . . . you will find it pays.

Write for our 102 page gear catalog.

Perkins Machine & Gear Co.

147 Circuit Ave.
SPRINGFIELD, MASS.



Complete stocks AVAILABLE IN THESE KEY CITIES

With warehouse stocks in seventeen of the principal cities of the United States, it is now an easy matter to obtain Electrunit Boiler Tubes on short notice. The remarkable qualities of these tubes have created a demand for them which in turn has made possible this nation-wide distributive service.

Boiler manufacturers, boiler repair contractors, engineers operating boiler plants and supervising replacements in the plant—all users of tubes will appreciate the service rendered by the distributors mentioned here—a service that cuts down plant inventory, permits purchasing to parallel the fluctuating requirements of business, and assures prompt delivery of tubes when needed.

There are two ways of finding out why Electrunit Boiler Tubes are better. Write today for complete descriptive literature, or better yet, send a trial order to your nearest distributor for your next boiler job. Then ask the men who install them what they think—and the answer is always the same, whether given verbally or in the labor-cost record.

STEEL AND TUBES, INC.

WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING

CLEVELAND • • • OHIO

A UNIT OF REPUBLIC STEEL CORPORATION

DISTRIBUTORS

BIRMINGHAM, ALA.
Young & Van Supply Co.

BUFFALO, N. Y.
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CHATTANOOGA, TENN.
Mills and Lupton Supply Company

CHICAGO, ILL.
Chicago Tube & Iron Company

CINCINNATI, OHIO
Williams & Company

CLEVELAND, OHIO
Williams & Company

DENVER, COLO.
Grimes Pipe & Supply Co.

DETROIT, MICH.
The Service Steel Co.

INDIANAPOLIS, IND.
W. J. Holliday Company

KANSAS CITY, MO.
Langdon Feeder Co.

KNOXVILLE, TENN.
C. M. McClung Company

LOS ANGELES, CALIF.
Ducommun Corp.

MEMPHIS, TENN.
Pidgeon-Thomas Iron Co.

NEW YORK, N.Y.
John B. Astell & Co.

PHOENIX, ARIZ.
Pratt & Gilbert Hardware Co.

PITTSBURGH, PA.
Williams & Company

SAN FRANCISCO, CALIF.
Ducommun Corp.

Economics of Planing Versus Milling

(Concluded from Page 23)

work less rapidly than the milling machine.

The planer is a cheaper tool than the milling machine when both are required to handle work of the same size. For example, a milling machine for machining work 3 ft. high, 4 ft. wide, and 12 ft. long, on three faces simultaneously, will cost nearly twice as much as a planer that will do the same job. When a great number of similar pieces is required, and the milling machine is equally or better adapted to do the work than the planer, milling machines are often cheaper than planers in first cost, for a given size of work.

Versatility of the Planer

Planers are more versatile than milling machines, and can be quickly and easily adapted to do almost any sort of flat or formed work that can be done by either machine. The cutting tools are cheap and easy to make. The planer is therefore superior when there is a variety of work and the lots are small. The milling machine usually, but not always, excels in mass production.

With equal workmanship, rigidity, and supervision, generating tools are more accurate than forming tools. Since the planer is usually used as a generating tool and the miller as a forming tool, the planer will do much more accurate work, with resultant savings in fitting and erecting, besides producing a more useful and longer-lived machine when the work is assembled. The true measure of value of a machine is not pieces produced per day, but total cost of required product and the sales value of the product. Higher machining costs on the planer are often more than offset by lower fitting, erecting, and service costs of the product. Sometimes the accuracy or finish required is such that the milling machine cannot be used, and the work must be done on the planer.

Machines having flat surfaces which rub together in service are more accurate, more rigid, wear better and last longer, and are worth more if these flat surfaces are planed. Special-type planers for special jobs are sometimes desirable. Switch planers and elevator-rail planers are examples. Planers have been built in which 40 tools are cutting at one time.

The planer is often neglected by the design and production engineering departments and the shop executives. In many shops where milling machines are generously equipped with tools and fixtures and intelligently supervised, the planer department is grudgingly supplied with tools and means for holding work, and receives no intelligent supervision. Under such conditions, the planer operates at only a

small per cent of its potential efficiency. The scrapping of obsolete planers and the intelligent use of modern planers will greatly decrease the cost of the product in most shops.

In the field of mass production, especially of small parts, the milling machine is usually greatly superior to the planer. On large work, repair and jobbing work, in shops where the production of identical pieces is limited to a few at a time, and on accurate work and in the toolroom, the planer is usually economically superior.

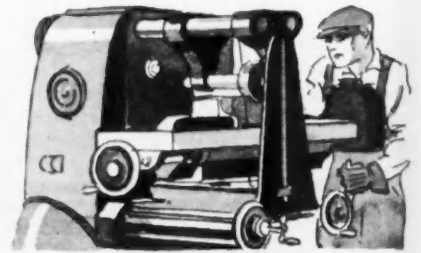
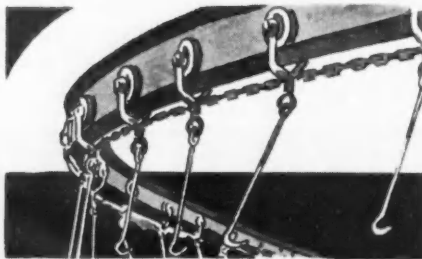
The fields of the planer and the milling machine overlap, even in mass-production work, where planers of special design may be employed, especially in cases where work of great accuracy or fine finish is required.

In the overlapping field, the planer is economically superior when working on large parts, when the material is unusually strong, tough, or hard, or has hard inclusions, when the amount of finish to be removed is great, when the areas to be machined are long and of uniform width, when accurate work is desired, when a good finish is desired, when low cost of machine is a ruling consideration, when low cost of tools and maintenance is a ruling consideration, when a versatile tool is necessary, and when superior accuracy and finish are required.

In the overlapping field, the milling machine is economically superior when working on small parts, when the material is relatively soft and weak, and free from hard inclusions, when the depth of finish to be removed is small, when the areas to be machined are mostly pads, bosses, and edges, when accuracy is a matter of secondary importance, when a first-class finish is unnecessary, when the quantity of suitable work warrants the purchase of a high-priced or a special machine, and when high cost of tools and equipment is justified by the number of identical pieces required.

Suggests the Milling Planer

When there is a question as to whether a planer or a milling machine should be purchased, a new type of machine tool, the milling planer, should be considered. This machine can do planing, milling, boring and



drilling in the same setting of the work, and combines the superior accuracy, finish, versatility, convenience of operation, and cheapness of tooling for special jobs, inherent in the planer, with the advantages of the milling machine in production work and in other work for which it is especially adapted.

There is a field for planers, milling planers, and milling machines in most shops of any size, and the special advantages of each of the three tools deserve the careful attention of both the engineers who design the parts to be machined on them and the production engineers responsible for the machining operations performed by them.

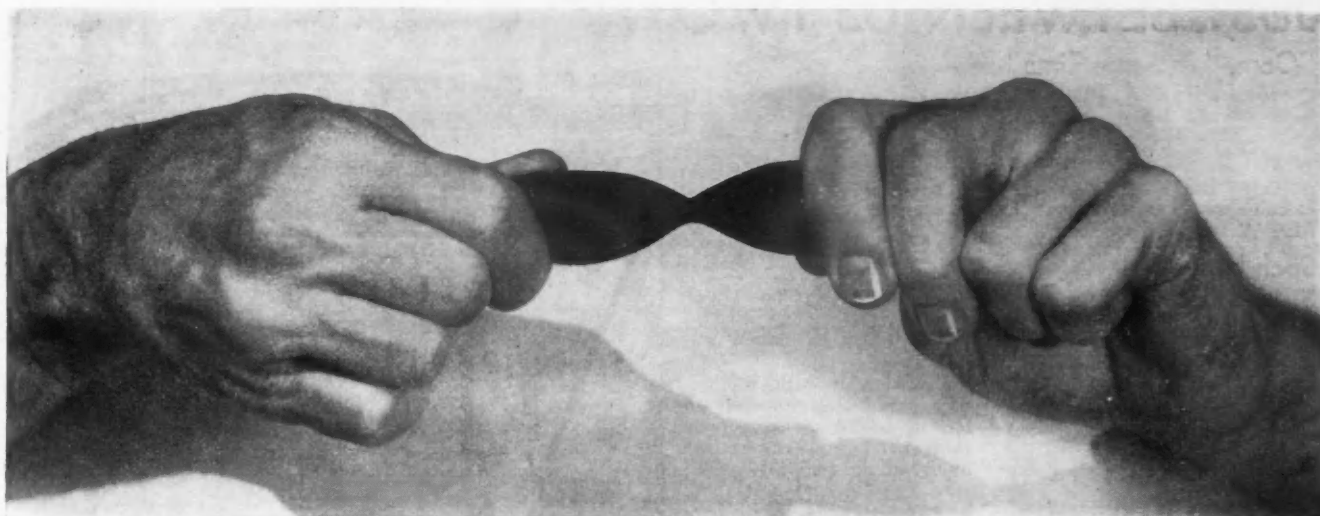
Controlled Carbon Steels

(Concluded from Page 26)

test or modifications thereof. Control of this in the production of basic open-hearth steels has been considered impossible, but such control is now claimed to have been attained by the Carnegie company. To prove its contentions the pamphlet outlines laboratory and plant tests, including details of 11 heats selected at random in regular production. These heats include four different grades and three different types, the grades based on the carbon and manganese content and the types upon the grain characteristics. The steels were shipped to some 30 manufacturers of automobile parts, railroad equipment, oil well equipment, grinding balls for cement, etc., to corroborate the laboratory observations.

Copies of the booklet may be had on request to the company.

Receivers in equity of Mead-Morrison Mfg. Co., East Boston, Mass., have applied to Court for authority to accept offer of Textile Machinery & Supply Co. to liquidate machinery and manufacturing equipment at East Boston plant. Under terms of offer, receivership estate will receive \$100,000 and share in proceeds of liquidation. The Mead-Morrison Mfg. Co. is to retain its inventories and finished products as well as its business of designing and installing structures and equipment for handling coal, ore and other bulk materials, manufacturing crawler cranes, truck winches, tractors, etc., and of furnishing service and repair parts for its products.



ACE HARD RUBBER TANK LINING

.... Pliable Tough Leathery

ACE hard rubber tank lining is perhaps the most versatile lining material on the market.

Acids and solutions usually considered actively destructive are handled without any evidence whatever of corrosion, at temperatures between zero and the boiling point.

This lining is adaptable for tanks of all sizes, shapes and capacities for storage, priming, filtering, measuring, pickling, plating, etc., as well as tank cars, troughs, fume ducts and stacks, and other equipment requiring permanent protection from corrosion.

Ace hard rubber tank lining is bonded to metal by means of

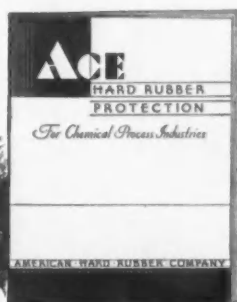
a thin layer of soft rubber which is not exposed to the chemical handled. Temperature changes are compensated for by the natural ability of the lining to withstand elongation up to 15%, and by the perfect bond of the inner soft rubber to the hard rubber lining and to the metal. The price for Ace rubber lining is

reasonable when the utility, efficiency and long life of such protected equipment is considered.

Send for complete catalogue and tank lining sample.

AMERICAN HARD RUBBER COMPANY
11 MERCER STREET • NEW YORK, N. Y.
Akron, Ohio
111 West Washington Street, Chicago, Ill.

TEAR OFF COUPON AND MAIL TO US



AMERICAN HARD RUBBER COMPANY
11 Mercer Street, New York, N. Y.

Gentlemen: Please send sample of pliable, leathery Ace hard rubber tank lining. Also include catalogue. No obligation incurred.

Name _____

Address _____

City _____ State _____

JUST BETWEEN US TWO

"Come Up Some Time"

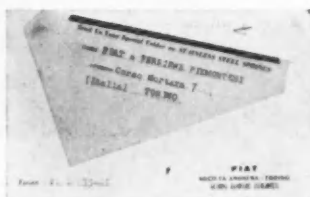
EMIL JANITZKY, Illinois Steel's metallurgical engineer, writes in Nov. 2 I.A.:

"The actual contour of the tensile test piece at the moment of rupture resembles closely the curvature of the witch of Agnesi."

Maybe the witch of Agnesi was hot stuff in her time, but calculus needs modernizing, so we suggest, "the curvature of Mae West."

Soch Noivel

THE one automobile manufacturer in these less and less United States who does not take The Iron Age temerarily asked us for a copy of the recent issue containing General Motors' estimates of 1934 sales.



We sent it with a sharp note, reminding him that unless he begins to learn something about his own business by reading regularly "This week on the Assembly Line," he will soon be out of business. Lookit Matheson, Pope-Hartford, Stevens-Duryea. Mere memories, if that.

Speaking of the automobile business, here's one of the thousands upon thousands—well anyway, here's one of the several returns Lee Spring Co. got from a recent ad in The Iron Age. The sender of the postal is Fiat, who also makes a pretty good car.

Mr. Dun, Be Yourself!

IF you don't believe that You Sit runs a laundry in Greenville, Miss., Mr. Dun, who gets out the financial register, is kidding cash customers . . . In the same city Fried Wolf runs, of all things, a meat store . . . A reader rebukes us for this recent phrase, "Much water has flown under Volga bridges." Like people who criticize Roosevelt, he just says we're wrong without telling us what is right. Should we have said, "has flew?" . . . Here it is only four weeks to New Year's and so far nobody has cooked up a fathead slogan about "1935 will be a good year for this or that or something." Which makes us feel rather hopeful. Is there anything as depressing as an optimistic slogan?

'Earl 'Earl

"If you don't believe so-and-so is a better paper for you than The Iron Age, ask your customers which they prefer." Those were the approximate words a competitor breathed into the ear of one of our advertisers. Maybe you received one of the questionnaires the advertiser sent out. Here's the final score:

| The papers read and preferred | | First preference |
|-------------------------------|-----|------------------|
| The Iron Age..... | 127 | 41 |
| Second paper..... | 122 | 21 |
| Third paper..... | 116 | 36 |
| Fourth paper..... | 89 | 16 |
| Fifth paper..... | 76 | 9 |

Because we usually come in first in such investigations, we think the questionnaire method of picking advertising mediums is swell.

Please, Mister, Give Us a Vote

TOSS a laurel wreath to Bethlehem for that ad on page 3 of Nov. 16 Iron Age, showing a photograph of articles made from Beth-Cu-Loy, with actual cost figures given. People like definite facts and figures.

By the way, David J. Champion, rivetmaker extraordinary, suggests:

"The Iron Age might enclose with each issue a postal ballot requesting readers to vote on the attractiveness of the various advertisements and offer a prize to the advertiser receiving the greatest number of favorable comments."

Because the post office guards its second class postage regulations even more jealously than a Phi Beta Kappa guards his key, we can't enclose a postcard. But a coupon knows no law. So you are prayerfully asked to indicate below your three selections:

To The Iron Age, 239 W. 39th St., New York

I like these ads in the Nov. 30 Iron Age:

Best.....Page.....

Second.....".....

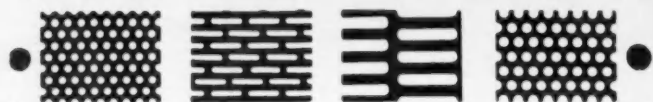
Third.....".....

Name.....

We probably have a considerable crust asking you to go to this trouble, when your only reward will be a stilted letter of thanks, containing a three-cent stamp, to pay for the postage, but you know how publishers are.

—A. H. D.

SCREENS of Perforated Metal



Metal of any kind
perforated to your
order.

Grilles of many
beautiful designs
see catalogue

Safety Guards
see booklet

Write for prices

The
Harrington & King
PERFORATING Co.

5657 Fillmore St., Chicago, Ill. 114 Liberty St., New York, N. Y.

LELAND-GIFFORD COMPANY

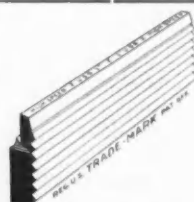
Worcester, Mass.

Drilling Machinery

Belt and Motor Spindle

One to Six Spindles

Tapping Attachments and Multiple Heads



Landis makes a complete line of threading equipment. Depend upon it, if you have a threading operation, Landis has a machine, die head or tap that will handle the job to better advantage.

Write today for literature.

LANDIS MACHINE CO., Inc.

Waynesboro, Penna., U. S. A.

GET IN THE HABIT

*of reading and using the
classified sections—they
are full of opportunities.*